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MISSOURI · KANSAS CITY RIVER BASIN

A.C. SCHNEIDER LAKE DAM
GASCONADE COUNTY, MISSOURI
MO. 31563

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

United States Army
Corps of Engineers
...Serving the Army
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St. Louis District

PREPARED BY: U. S. ARMY ENGINEER DISTRICT, ST. LOUIS

FOR: STATE OF MISSOURI

SEPTEMBER, 1980

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19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Dam Safety, Lake, Dam Inspection, Private Dams

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report was prepared under the National Program of Inspection of Non-Federal Dams. This report assesses the general condition of the dam with respect to safety, based on available data and on visual inspection, to determine if the dam poses hazards to human life or property.

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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 TUCKER BOULEVARD, NORTH
ST. LOUIS, MISSOURI 63101

REPLY TO ATTENTION OF

SUBJECT: A. C. Schneider Lake Dam (MO 31563)

This report presents the results of field inspection and evaluation of the A. C. Schneider Lake Dam. It was prepared under the National Program of Inspection of Non-Federal Dams.

SUBMITTED BY: SIGNED — 9 JUL 1981
Chief, Engineering Division — Date

APPROVED BY: SIGNED — 10 JUL 1981
Colonel, CE, Commanding — Date

A. C. SCHNEIDER LAKE DAM
GASCONADE COUNTY, MISSOURI

MISSOURI INVENTORY NO. 31563

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED BY
CONSOER, TOWNSEND AND ASSOCIATES, LTD.
ST. LOUIS, MISSOURI
AND
PRC ENGINEERING CONSULTANTS, INC.
ENGLEWOOD, COLORADO
A JOINT VENTURE

UNDER DIRECTION OF
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
FOR
GOVERNOR OF MISSOURI

SEPTEMBER 1980

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam: A.C. Schneider Lake Dam, Missouri Inv. No. 31563
State Located: Missouri
County Located: Gasconade
Stream: An unnamed tributary of the Frene Creek
Date of Inspection: April 24, 1980

Assessment of General Condition

A.C. Schneider Lake Dam was inspected by the engineering firms of Consoer, Townsend and Associates, Ltd. and PRC Engineering Consultants, Inc. (A Joint Venture) of St. Louis, Missouri according to the U. S. Army Corps of Engineers "Engineer Regulation No. 1110-2-106" dated September 26, 1979, and additional guidelines furnished by the St. Louis District of the Corps of Engineers. Based upon the criteria in the guidelines, the dam is in the high hazard potential classification, which means that urban development with more than a small number of habitable structures could be affected in the event of failure of the dam. Within the estimated damage zone of two miles downstream of the dam are two dwellings, seven buildings, two trailers, an oil depot, sewage lagoons and a state highway (Hwy 100) which may be subjected to flooding, with possible damage and/or destruction, and possible loss of life. A.C. Schneider Lake Dam falls below the small size classification since it is less than 25 feet in height, and impounds less than 50 acre-feet of water.

The dam appears to be in satisfactory condition. However, the dam does not have adequate spillway capacity. Considering the number of inhabited dwellings, a state highway and an oil depot being located downstream of the dam, the PMF is considered the appropriate spillway design flood for A.C. Schneider Lake Dam. ~~Our~~ The inspection and evaluation indicates that the reservoir/spillway system can accommodate approximately 5 percent of the Probable Maximum Flood without overtopping the dam. ~~Our evaluation~~ also indicates that the reservoir/spillway system can not accommodate the one-percent chance flood without overtopping, however, the reservoir/spillway system of A.C. Schneider Lake Dam can accommodate the ten-percent chance flood without overtopping.

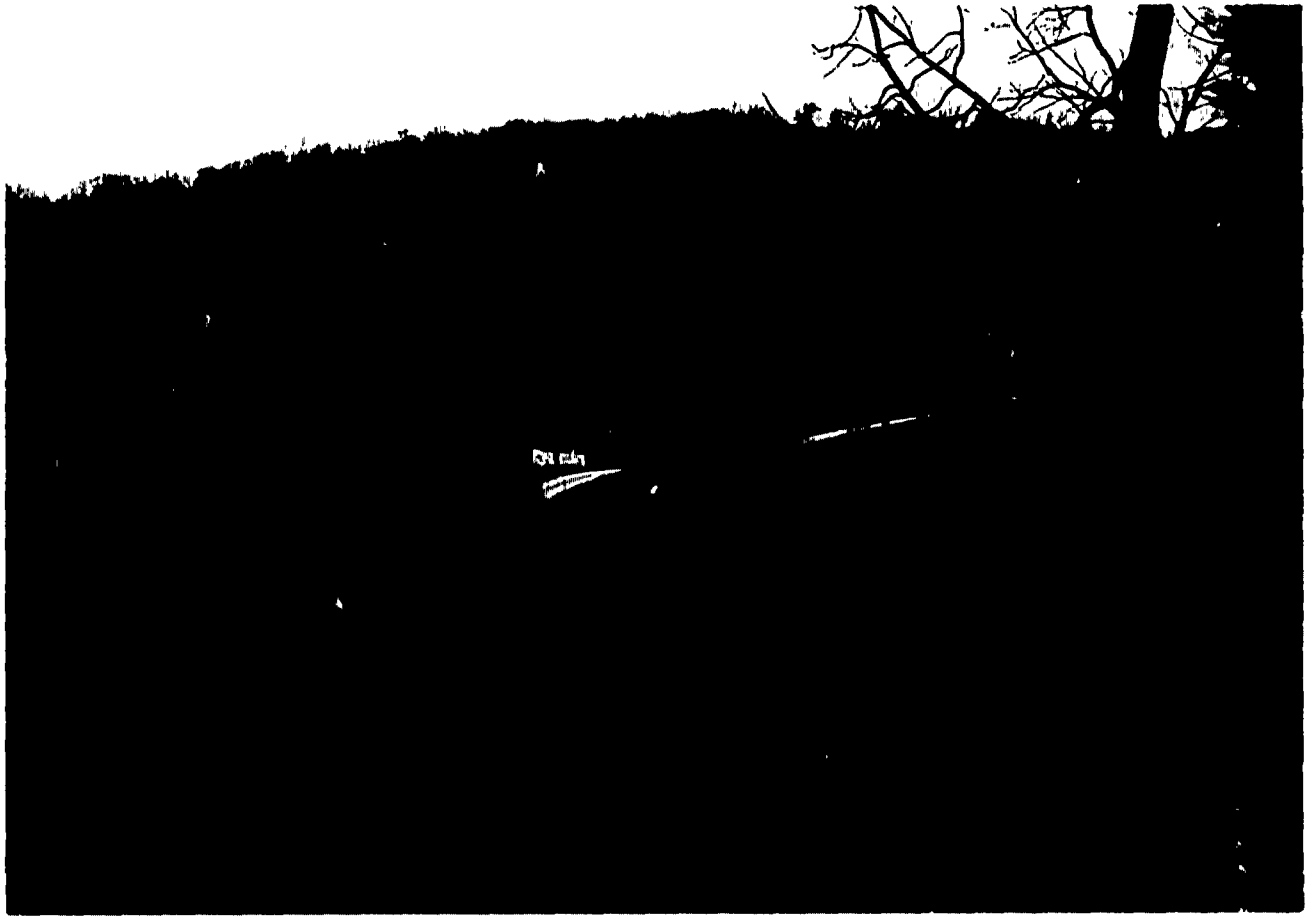
The Probable Maximum Flood is defined as the flood discharge that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in the region.

Other deficiencies noted by the inspection team were: the erosion gully along the downstream left abutment/embankment contact, the trees on the downstream and upstream slopes of the dam, wave erosion on the upstream slope, the unsupported length of the principal spillway pipe at the outlet, the eroded gulley in the emergency spillway channel, some vegetative growth around the principal spillway inlet, a need for periodic inspection by a qualified engineer and a lack of maintenance schedule. The lack of seepage and stability analyses on record is also a deficiency that should be corrected.

It is recommended that the owner take action to correct or control the deficiencies described above.

Walter G. Shifrin, P.E.

STATE OF MISSOURI
WALTER G. SHIFRIN
NUMBER E-8834
REGISTERED PROFESSIONAL ENGINEER



Overview of A. C. Schneider Lake Dam

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

A. C. SCHNEIDER LAKE DAM, I.D. No. 31563

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

A. C. SCHNEIDER LAKE DAM, Missouri Inv. No. 31563

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

The Dam Inspection Act, Public Law 92-367 of August, 1972, authorizes the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspections. Inspection for A C. Schneider Lake Dam was carried out under Contract DACW 43-80-C-0094 between the Department of the Army, St. Louis District, Corps of Engineers, and the engineering firms of Consoer, Townsend & Associates, Ltd., and PRC Engineering Consultants, Inc. (A Joint Venture), of St. Louis, Missouri.

b. Purpose of Inspection

The visual inspection of A. C. Schneider Lake Dam was made on April 24, 1980. The purpose of the inspection was to make a general assessment regarding the structural integrity and operational adequacy of the dam embankment and its appurtenant structure .

c. Scope of Report

This report summarizes available pertinent data relating to the project, presents a summary of visual observations made during the field inspection, presents an assessment of hydrologic and hydraulic conditions at the site, presents an assessment of the structural adequacy of the various project features and assesses the general condition of the dam with respect to safety.

Subsurface investigations, laboratory testing and detailed analyses were not within the scope of this study. No warranty as to the absolute safety of the project features is implied by the conclusions presented in this report.

It should be noted that in this report reference to left or right abutments is viewed as looking downstream. Where left abutment or left side of the dam is used in this report, this also refers to the south abutment or side, and right to the north abutment or side.

d. Evaluation Criteria

The inspection and evaluation of the dam is performed in accordance with the U.S. Army Corps of Engineers "Recommended Guidelines for Safety Inspection of Dams", and additional guidelines furnished by the St. Louis District office of the Corps of Engineers for Phase 1 Dam Inspection.

1.2 Description of the Project

a. Description of Dam and Appurtenances

The following description is bas ' upon observations and measurements made during the visual inspection and from conversations with Mr. A. C. Schneider, the owner. No design drawings were located for the dam ~1 appurtenant structures. There is a dam adjacent to A. C. Schneider Lake Dam. The descriptions given below pertain to only A. C. Schneider Lake Dam (Mo. 31563).

The dam is a homogeneous rolled earthfill structure between earth abutments. The top of dam has a total length of 321 feet between the emergency spillway and the right abutment. The dam has a slight curvature in its alignment, convex in the downstream direction (Photo overview). The top of dam is 18 feet wide. The maximum top of dam elevation is 701 feet above mean sea level (MSL) adjacent to the emergency spillway; and this elevation extends to a point 150 feet to the right of the emergency spillway. At the point 150 feet to the right of the emergency spillway, the top of dam elevation drops approximately 2 feet from that point to the right abutment. The maximum height of the dam from the downstream streambed is 20.4 feet. The upstream slope was measured as 1 vertical to 3 horizontal (1V to 3H) from the top of dam to the water surface. The downstream slope was measured as 1V to 3H. No riprap was provided as slope protection on the upstream slope.

The dam was constructed incorporating two spillways into the embankment, a principal spillway consisting of a welded steel pipe and an emergency spillway consisting of an open channel through the top of dam. The principal spillway

has a 14 inch inside diameter and is approximately 92 feet in length. The pipe was laid through the embankment on about a 15 percent slope and the last 29 feet of it extends unsupported from the downstream slope (Photo 6). This allows the outflow to fall a few feet from the end of the pipe into the downstream channel. The inlet end of the pipe has a flat steel plate, approximately 16 inches square, welded in a parallel position to the outside top of the pipe. The end of the pipe is cut on a 45 degree angle with the top of the pipe protruding over the bottom (Photo 5). The elevations of the invert at the inlet and outlet ends respectively are 697.3 and 682.5 feet above M.S.L.

The emergency spillway crest is approximately 2.5 feet lower than the maximum elevation of the top of dam, whereas the principal spillway inlet crest is approximately 3.7 feet lower than the maximum elevation of the top of dam. The emergency spillway crest area is well protected with grass over its entire surface; it functions as an open channel and has a 35 foot top width with a 16 foot bottom width (Photo 8). However, once flow passes over the crest it falls over a 1 foot drop and enters a steep narrower channel that appears to have been eroded into the slope due to surface runoff from the surrounding slopes above the dam and discharges through the spillway. This eroded channel allows the excess reservoir water to enter the downstream channel at the same point as that from the principal spillway (Photo 6).

A small low level drain was provided for the dam. It consists of a 1-1/4-inch diameter steel pipe which passes through the embankment. On the upstream end, a 3-foot high perforated standpipe was provided to keep the intake of the system off of the reservoir floor. The system is controlled at the downstream end by a 1-1/4-inch gate valve. The gate

valve is housed in a vertical 12 inch diameter corrugated metal pipe located near the center of the dam just downstream of the toe of the embankment. The system is mainly used to provide drinking water for livestock.

b. Location

A. C. Schneider Lake Dam is located in the state of Missouri, Gasconade County, across an unnamed tributary to Frene Creek, which is tributary to the Missouri River. The damsite is approximately 5 miles southwest of Hermann, a community on the Missouri River, and can be found on the 7.5 minute series of the Hermann, Mo. Quadrangle Sheet in Section 15 of Range 5 West and Township 45 North.

c. Size Classification

According to the "Recommended Guidelines for Safety Inspection of Dams" by the U.S. Department of the Army, Office of the Chief Engineer, the dam falls below the small size classification, since it is less than 25 feet high and impounds less than 50 acre-feet of water.

d. Hazard Classification

The dam has been classified as having a "High" hazard potential in the National Inventory of Dams, on the basis that in the event of failure of the dam or its appurtenances, excessive damage could occur to downstream property, together with the possibility of the loss of life. Our findings concur with this classification. Within the estimated damage zone, which extends approximately two miles downstream of the dam, are two dwellings, two trailers, seven buildings, sewage lagoons, an oil depot, and a state highway (Hwy 100).

e. Ownership

A. C. Schneider Lake Dam is owned privately by Mr. & Mrs. A. C. Schneider. The mailing address is Mr. & Mrs. A. C. Schneider, 317 West 16th Street, Hermann, Missouri 65041.

f. Purpose of Dam

The main purpose of the dam is to impound water for recreational use as a private lake. Another purpose is as a reserve for livestock watering.

g. Design and Construction History

According to the owner, Mr. A. C. Schneider, the dam was built in 1967 (est.) by Mr. Glennon Epple of Hermann, Missouri. There were no plans or specifications for the dam.

The original emergency spillway was at the right abutment of the dam. Another lake was built adjacent to the northwest side of the dam in 1970. A 15-inch diameter culvert was installed at this time to connect the two lakes and the emergency spillway for A. C. Schneider Lake Dam was relocated to the left abutment.

A 14-inch diameter spillway pipe was installed about five years after the dam was completed. The pipe was installed on the basis of the recommendations of Mr. Elmer Kuhn, who was the local soil conservationist in Hermann, Missouri.

h. Normal Operational Procedures

A. C. Schneider Lake Dam is used to impound water for recreational use. Normal procedure is to allow the lake level to remain as high as rainfall, runoff, evaporation and the 14-inch diameter spillway pipe will allow.

1.3 Pertinent Data

a. Drainage Area (square miles):	0.12
b. Discharge at Damsite	
Estimated experienced maximum flood (cfs):	30
Estimated ungated spillway capacity with reservoir at minimum top of dam elevation (cfs):	34
c. Elevation (feet above MSL)	
Top of dam (minimum):	699
Spillway crest:	
Principal Spillway:	697.3
Emergency Spillway:	698.5
Normal Pool:	697.3
Maximum Experienced Pool:	698.7
Observed Pool:	697.3
d. Reservoir	
Length of pool with water surface at minimum top of dam elevation (feet):	400±
e. Storage (Acre-Feet)	
Top of dam (minimum):	20
Spillway crest:	
Principal Spillway:	16
Emergency Spillway:	20-
Normal Pool:	16
Maximum Experienced Pool:	20-
Observed Pool:	16

f. Reservoir Surfaces (Acres)

Top of dam (minimum):	2.4
Spillway crest:	
Principal Spillway:	2
Emergency Spillway	2.3
Normal Pool:	2
Maximum Experienced Pool:	2.3+
Observed Pool:	2+

g. Dam

Type:	Earthfill
Length:	356 feet
Structural Height:	20.4 feet
Hydraulic Height:	20.4 feet
Top width:	18 feet
Side slopes:	
Downstream	1V to 3H (measured)
Upstream	1V to 3H (from crest to W.S., remainder unknown)
Zoning:	Homogeneous
Impervious core:	N/A
Cutoff:	Core trench
Grout curtain:	Unknown

h. Diversion and Regulating Tunnel None

i. Spillway

Type:	
Principal:	14-inch inside diameter welded steel conduit
Emergency:	Trapezoidal open channel, uncontrolled
Length of crest:	
Principal:	14-inch I.D. steel conduit
Emergency:	16 feet

j. Regulating Outlets

Type:	1-1/4-inch diameter steel pipe
Length:	100±
Closure:	1-1/4-inch diameter gate valve

SECTION 2: ENGINEERING DATA

2.1 Design

No design data is available for the dam and appurtenant structures.

2.2 Construction

The dam was built by Mr. Glennon Epple of Hermann, Missouri. No construction records or data are available for the dam and appurtenant structures. According to Mr. A. C. Schneider, the embankment was mostly constructed of clay removed from the reservoir area. A cutoff trench was provided; however, the trench was not excavated to bedrock. The compaction of the embankment was achieved by the activity of the earthmoving equipment used for the placement of the fill. No compaction tests were performed.

2.3 Operation

No operational records or data are available for A. C. Schneider Lake Dam.

2.4 Evaluation

a. Availability

No design drawings, design computations, construction data or operation data are available.

Also, no pertinent data were available for review of hydrology, spillway capacity, flood routing through the reservoir, outlet capacity, slope stability, seepage analyses, or foundation conditions.

b. Adequacy

The lack of engineering data did not allow a definitive review and evaluation. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing and evaluating design, operation and construction data, but is based primarily on visual inspection, past performance history, and sound engineering judgement.

Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency. These seepage and stability analyses should be performed for appropriate loading conditions (including earthquake loads) and made a matter of record.

c. Validity

No engineering data were available which would allow a valid evaluation of original design concepts.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

A visual inspection of the A. C. Schneider Lake Dam was made on April 24, 1980. The following persons were present during the inspection:

Name	Affiliation	Disciplines
Dr. M.A. Samad	PRC Engineering Consultants, Inc.	Project Engineer, Hydraulics and Hydrology
Mark R. Haynes	PRC Engineering Consultants, Inc.	Soils and Mechanical
Robert G. McLaughlin	PRC Engineering Consultants, Inc.	Civil
Razi Quraishi	PRC Engineering Consultants, Inc.	Geology
John Lauth	Consoer, Townsend & Assoc., Ltd.	Civil and Structural
Mr. A. C. Schneider	Owner of dam	

Specific observations are discussed below.

b. Dam

The top of dam is protected against surface erosion by a well maintained vegetative cover. The curvature in the alignment and the difference in elevation between the right and left abutments does not appear to be due to an instability in the embankment. The dam appears to have been constructed this way. No other deviations in horizontal or vertical alignment were apparent. Minor shrinkage cracks were observed. There was no evidence observed on the top of dam of significant settlement or cracking which would indicate an instability of the embankment. According to Mr. A. C. Schneider, the dam has never been overtopped and no evidence was observed indicating the contrary (Photo 1).

The upstream slope has no riprap protection. Some minor erosion has occurred on the slope near the water surface due to wave action. The slope above the water surface was protected from surface erosion by an adequate vegetative growth. No depressions, cracks or settlements which would indicate an instability of the slope were apparent. Several trees were observed growing on the slope near the water surface (Photo 4).

The downstream slope of the dam is well protected against surface erosion by a dense growth of vegetative cover (Photo 3). One large erosion gully was observed along the left embankment/abutment contact. The gully appears to have been formed by surface runoff and discharges through the emergency spillway. The gully extends from near the crest of the emergency spillway to the downstream channel. The gully varies in size from 1-foot wide and 1-foot deep near the crest

of the emergency spillway to 6-foot wide and 6-foot deep near the toe of the embankment. The erosion appears to have undermined a portion of the principal spillway pipe. (Photo 9). No seepage was observed on the downstream slope or downstream of the toe. Several large trees were observed on the downstream slope. No bulges, depressions or cracks which would indicate an instability of the slope were apparent. (Photo 3).

No rodent activity was apparent on the embankment or abutments. According to Mr. A. C. Schneider, there has been some muskrat activity in the reservoir in the past. The muskrats are trapped during the winter when present.

The top of the right abutment is at approximately the same elevation as the top of dam and supports a gravel access road. The road is constructed along the right downstream embankment/abutment contact. The left abutment area slopes gently upward from the contact and supports a heavily wooded area. No erosion which would affect the safety of the embankment or appurtenant structures was observed on either abutment, except for the previously mentioned erosion along the left embankment/abutment contact. No seepage or instabilities which would affect the safety or stability of the dam were apparent on either abutment.

c. Project Geology and Soils

(1) Project Geology

The damsite is located on an unnamed tributary of the Frene Creek in the Salem Plateau Section of the Ozark Plateaus Physiographic Province.

Deep dissection of topography by major streams is one of the important characteristics of the Salem Plateau Section. Cuestaform topography is exhibited in this plateau section consisting of two major escarpments, namely the Crystal Escarpment and Burlington Escarpment. Deep dissection in dolomites and limestones is a major factor in the development of many springs in this area. The topography of the damsite is rolling to hilly with U- to V-shaped valleys. Elevation ranges from 927 feet above M.S.L. (nearly 0.5 miles southwest of the damsite) to 700 feet above M.S.L. at the A. C. Schneider Lake. The reservoir slopes are generally 5^{o} to 20^{o} from horizontal. The reservoir appears to be water tight and free of any potential slide activity. The area at the damsite is covered with slope wash deposits of glacial fluvial and loess origin. They consist of reddish brown, clayey silt with some fine to medium sand. Inlet and outlet areas of the unnamed tributary to the Frene Creek contain Quaternary alluvium. Outcrops of Ordovician moderately weathered yellowish-white hard Dolomitic rocks are interbedded with moderately weathered light-brown hard sandstones. These are exposed at the spillway cut and at the downstream channel of the spillway. These rocks have a horizontal jointing pattern. These rocks are horizontally bedded.

The areal geology beneath the slope wash deposits in the site vicinity, as shown on the Geologic Map of Missouri (1979), Plate 3, consists of Pennsylvanian rock undifferentiated, Ordovician St. Peters Sandstone, and Ordovician Dolomitic rocks.

No faults have been identified in the vicinity of the damsite. The closest trace of any fault to the damsite is the Cuba Fault nearly 22.5 miles south of the damsite. The Cuba Fault had its last movement in post-Pennsylvanian time. This fault appears to have no effect on the damsite.

A. C. Schneider Lake Dam consists of a homogeneous earthfill embankment, an emergency spillway located at the left end of the embankment, and an outlet pipe located near the mid-section of the embankment. No boring logs or construction reports were available which would indicate foundation conditions encountered during the dam construction. Based on discussions with the owner, the embankment probably rests on slope wash deposits of brown clayey silt. Hard Dolomitic rock interbedded with shales and sandstone are exposed in the downstream channel at the outlet of the spillway. The foundation material underneath the spillway outlet pipe consists of compacted embankment material (brown clayey silt, with some fine to medium sand). The downstream channel rock cut slopes are relatively stable. Minor localized rock debris were observed at the foot of the slope in the downstream channel walls of the spillway.

(2) Project Soils

According to the "Missouri General Soil Map and Soil Association Descriptions" published by the Soil Conservation Service, the materials in the general area of the dam belong to the soil series of Gerald-Union-Goss in the Ozarks family. The soils were basically formed from loess and cherty limestone residuum. The permeability of these soils ranges from moderate to very slow.

Materials were removed from both the left and right embankments at approximately 1 foot below the vegetative cover. The material examined on the left embankment appeared to be a tan, silty, fine to medium sand with some fine to coarse gravel. Based upon the Unified Soil Classification System, the soil would probably be classified as an SM. This soil type generally has the following characteristics: semipervious to impervious with a coefficient of permeability less than 100 feet per year, medium to high shear strength, and a low to intermediate resistance to piping. The material examined on the left abutment appeared to be a tan, clayey, fine to medium, sand with some fine to coarse gravel. Based upon the Unified Soil Classification System, the soil would probably be classified as an SM-SC. This soil type generally has the following characteristics: semipervious to impervious with a coefficient of permeability less than 100 feet per year, medium to high shear strength, and a low to intermediate resistance to piping.

d. Appurtenant Structures

(1) Principal Spillway

The principal spillway conduit probably has no protective coating along its entire length which would prevent rust and corrosion from taking place. Also, under a full conduit, velocities could be high and set up severe vibrations in the latter 29 feet of unsupported spillway conduit. There are trees, grass and brush growing immediately adjacent to the spillway opening, plus a small pile of brush seemingly floating in front of the inlet, approximately 10 feet away (Photo 5).

(2) Emergency Spillway

The emergency spillway crest seems to be adequately protected with a dense grass cover (Photo 8), however, the discharge channel appears to be an erosion gulley which grows larger as the downstream end is approached (Photo 9). It seems likely that the erosion is due to runoff from the nearby surrounding slopes and perhaps, partially from flow over the emergency spillway crest. It appears quite possible that the gulley has undermined the end of the principal spillway pipe thus causing the 29 feet of unsupported extension (Photo 6).

(3) Outlet Works

The gate valve which controls the low level drain is operable and was operated on the day of the inspection (Photo 7). If needed, the system can be used to drain the reservoir. Nevertheless, the reservoir has never been drained. No seepage was observed around the outlet end of the system. The inlet of the drain was not located due to the

reservoir level on the day of the inspection.

e. Reservoir Area

The reservoir water surface elevation was 697.3 feet above M.S.L. on the day of the inspection. The reservoir rim has mild to steep slopes and is mostly grass and/or tree covered. There were no indications of instability or severe erosion observed. The slopes above the left rim area are steep and tree covered; those towards the rear of the reservoir are mild and tree covered and those on the right are mild and grass covered. There are no homes or other structures in the immediate vicinity of the reservoir, however, there is a barn or shed sitting about 100 feet downstream and below the top of dam and a dwelling sitting about 400 feet upstream and above the top of dam.

f. Downstream Channel

The downstream channel is well defined. The channel has a bottom width of approximately five feet and a side slope of 1V to 1H on both sides. The channel is approximately three feet deep. Some trees were observed growing in the channel. The trees could affect the hydraulic efficiency of the channel.

3.2 Evaluation

The visual inspection did not reveal any items which were sufficiently significant to indicate a need for immediate remedial action. The following conditions were observed which could affect the safety of the dam or which will require maintenance within a reasonable period of time.

1. The large erosion gully along the downstream left embankment/abutment contact affects the stability of the embankment. Continual erosion could possibly lead to an eventual failure of the embankment (Photo 9).

2. The trees observed on the downstream and upstream slopes pose a potential danger to the safety of the dam depending upon the extent of the root system. The roots of trees present possible paths for piping through the embankment. The root systems can also do damage to the embankment if the tree is uprooted by a storm (Photos: overview,3,4).

3. The minor wave erosion on the upstream slope does not appear to affect the stability of the dam at its present state. Nevertheless, continual erosion of the slope could be detrimental to the stability of the dam.

4. The growth of grass, brush, and trees immediately adjacent to the principal spillway inlet, plus the floating debris in front of the inlet could cause at least a partial blocking of the inlet, thus causing water to rise faster during a large storm (Photo 5).

5. The vibrations set up in the unsupported conduit at the outlet end of the principal spillway, when running full, could cause repercussions along the full length of the pipe which could eventually lead to seepage (Photo 6).

6. The discharge channel for the emergency spillway could futher erode and not only continue to undermine the conduit but also create a weakening along the abutment contact area. (See no. 1. above), (Photo 6).

7. Although no severe rust conditions or corrosion were observed along the pipe, the rust reaction was taking place and could progress to a severly worsened state in the future.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

There are no specific procedures which are followed for the operation of this dam. As mentioned in Section 1.2, the lake is allowed to remain as full as possible as a result of rainfall, runoff, evaporation and the crest elevation of the 14-inch diameter principal spillway.

4.2 Maintenance of Dam

The dam is maintained by the owner, Mr. A. C. Schneider. Periodically, the grass on the dam is mowed. A few small trees, saplings and brush have been allowed to grow on the upstream and downstream slope of the dam. The upstream and downstream slopes should be maintained in such fashion that trees are not allowed to grow.

There is an erosion gully forming at the left abutment contact at the downstream side of the emergency spillway. Gullies on the embankment should be repaired as a part of the maintenance routine.

4.3 Maintenance of Operating Facilities

The only operable facility at the damsite is a 1 1/4-inch gate valve located at the downstream toe. The valve and associated 1 1/4-inch piping is used for livestock watering.

4.4 Description of Any Warning System in Effect

The inspection team is not aware of any existing warning system for this dam.

4.5 Evaluation

The operation and maintenance for this dam seem to be adequate, however, the corrective measures listed in Section 7 should be undertaken within a reasonable period of time.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design

There is a dam adjacent to A.C. Schneider Lake Dam, and the reservoirs of these two dams are connected by a culvert. A roadway separates these two reservoirs. These two reservoirs are considered separately in the overtopping analysis. The watershed area of A.C. Schneider Lake Dam consists of approximately 78 acres. There are two significant upstream dams above A.C. Schneider Lake Dam and one upstream dam above the Adjacent Dam. Most of the watershed area is wooded with some range and pasture land. Land gradients in the watershed average roughly 18 percent. A.C. Schneider Lake Dam is located on an unnamed tributary of Frene Creek. The reservoir is about 2-1/4 miles upstream from the confluence of the unnamed tributary and Frene Creek. At its longest arm the watershed is approximately one-half mile long. A drainage map showing the watershed and the downstream hazard zone is presented as Plate 1 in Appendix B.

Evaluation of the hydraulic and hydrologic features of A.C. Schneider Lake Dam was based on criteria set forth in Corps of Engineers' "Recommended Guidelines for Safety Inspection of Dams" and additional guidance provided by the St. Louis District of the Corps of Engineers. The Probable Maximum Flood (PMF) was calculated from the Probable Maximum Precipitation (PMP) using the methods outlined in the U.S. Weather Bureau Publication, Hydrometerological Report No. 33.

The probable maximum storm duration was set at 24 hours, and storm rainfall distribution was based on criteria given in EM 1110-2-1411 (Standard Project Storm). The SCS method was used for deriving the unit hydrographs, utilizing the Corps of Engineers' computer program HEC-1 (Dam Safety Version). The SCS method was also used for determining the loss rates. The hydrologic soil group of each dam's watershed was determined from published soil maps. The curve number, the unit hydrograph parameters, and the PMP rainfall were directly input to the HEC-1 (Dam Safety Version) computer program to obtain the PMF hydrographs. Both the PMF and the one-half PMF inflow hydrographs at the upstream dams were routed through the upstream reservoirs by the Modified Puls Method, utilizing the HEC-1 (Dam Safety Version) computer program. Storms of 50 percent and 25 percent PMF, respectively, preceded the PMF and 50 percent PMF routing by four days. It was assumed, at the beginning of the antecedent storm, that the upstream reservoir water levels were at their mean annual high water elevations, which were, in turn, estimated at their respective spillway crests. The reservoir water levels remain at their respective spillway crest elevations immediately following the above mentioned four day antecedent routing period. Thus, the respective reservoir water levels were assumed at the spillway crests during the start of the routing computations for the PMF, the one-half PMF, and other PMF-ratio floods. The failure elevations of the upstream dams were set at the minimum elevations of each top of dam. The breach dimensions for the upstream dams were determined according to the guidelines furnished by the St. Louis District Corps of Engineers and by taking into consideration the water surface elevation of the downstream reservoir in case the reservoir backs up against the upstream dam.

The outflow hydrographs at the dam immediately upstream of A. C. Schneider Lake Dam were combined with the PMF and the one-half PMF hydrographs for A.C. Schneider Lake Dam. The peaks of the combined hydrographs are 1,738 cfs for the PMF and 823 cfs for the one-half PMF. The combined hydrographs for both the PMF and the one-half PMF, were then routed through A.C. Schneider Lake Dam reservoir. Flow through the culvert connecting A.C. Schneider Lake and the Adjacent Reservoir was neglected in the routing computation. The reservoir water level was assumed at mean annual high water elevation in the beginning of the routing computation. The peak outflow discharges for the PMF and the one-half PMF at A.C. Schneider Lake Dam are 1,738 cfs and 810 cfs respectively. Both the PMF and the one-half PMF when routed through the reservoir resulted in overtopping of A.C. Schneider Lake Dam.

An approximate similiar flood routing was done for the Adjacent Dam. The routing computations showed that the maximum water level in the Adjacent Reservoir during the PMF was lower than the maximum water level in A.C. Schneider Lake Dam Reservoir. The maximum difference in water surface elevation was approximately one foot. The water level fluctuations in both the reservoirs during the PMF are presented in the form of a graph in Appendix B.

The sizes of physical features utilized to develop the stage-outflow relation for the spillways and overtopping of the dams were prepared from field notes and sketches prepared during the field inspection. The reservoir elevation-area data were obtained from the U.S.G.S. Hermann, Missouri Quadrangle topographic map (7.5 minute series). The spillway and dam overtop-rating curve and the reservoir-elevation-area curve for A.C. Schneider Lake Dam are presented in Appendix B.

The hydrologic design of a dam, regarding dam safety, must have as an objective, the prevention of overtopping. Overtopping is especially dangerous for an earth dam because of its erodable characteristics. The safe hydrologic design of an embankment dam requires a spillway discharge capability combined with an embankment crest height the combination of which can handle a very large and exceedingly rare flood without overtopping.

The Corps of Engineers designs dams to safely pass the Probable Maximum Flood that could be generated from the dam's watershed. This is generally the standard for dam safety where overtopping would pose any threat to human life. Accordingly, the hydrologic requirement for safety for this dam is the capability to pass the Probable Maximum Flood without overtopping.

b. Experience Data

It is believed that records of reservoir stage or spillway discharge are not maintained for this site. However, according to the owner, the maximum reservoir level was approximately a few inches above the emergency spillway at the left abutment.

c. Visual Observations

Observations made of the spillways during the visual inspection are discussed in Section 3.1.d and evaluated in Section 3.2.

d. Overtopping Potential

As indicated in Section 5.1.a, both the Probable Maximum Flood, and one-half of the Probable Maximum Flood when routed through the reservoir, resulted in overtopping of A.C. Schneider Lake Dam. The peak outflow discharges for the PMF and the one-half PMF are 1,738 and 810 cfs, respectively. The maximum capacity of the spillways of A.C. Schneider Lake Dam just before going over the minimum elevation of the top of the dam is 34 cfs. The PMF overtopped the dam by 2.44 feet and the one-half PMF overtopped the dam by 1.65 feet. The total duration of overflow over the lowest point at the top of the dam is 10.33 hours during the PMF and 6.17 hours during the one-half PMF. The spillway/reservoir system of A.C. Schneider Lake Dam is capable of accommodating a flood equal to approximately 5 percent of the PMF just before overtopping. The reservoir/spillway system will not accommodate the one-percent chance flood without overtopping, however, the reservoir/spillway system can accommodate the ten-percent chance flood without overtopping. The results of the flood routings are summarized in the following table:

Summary of Routing of Floods

Flood Routed	Max. Pool Elevation (M.S.L.)	Maximum Discharge (cfs.)	Depth of Overtopping (feet)	Duration of Overtopping (hrs.)
10-yr.	698.87	27	0	0
100-yr.	699.32	128	0.32	1.17
5%PMF	698.96	32	0.00	0
6%PMF	699.04	45	0.04	0.5
50%PMF	700.65	810	1.65	6.15
100%PMF	701.44	1738	2.44	10.33

The surface soils in the embankment and the emergency spillway appears to be a sand-silt mixture. The dam is overtopped by over 2 feet during the occurrence of the PMF. The maximum velocity of flow in the emergency spillway during the PMF will be about 7 ft./sec. The velocity in the emergency spillway will thus exceed the permissible velocity of 5 ft/sec. The dam would also be susceptible to erosion due to high velocity of flow on its downstream slope, due to overtopping of the dam.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

There were no major signs of settlement or distress observed on the embankment or foundation during the visual inspection. The erosion gully along the downstream left embankment/abutment contact affects the stability of the embankment, however, on the day of the inspection the embankment appeared to be stable. The minor erosion of the upstream slope due to wave action was not serious enough to constitute an unsafe condition. In the absence of seepage and stability analyses, no quantitative evaluation of the structural stability can be made.

Although there were no visible signs of instability connected with the principal spillway or the emergency spillway, they were not observed under the high flow conditions which would test their stability. The creation of unstable conditions can however be surmised from observing the cantilevered position of the spillway pipe and the previously eroded downstream discharge channel of the emergency spillway. It seems apparent that the pipe was not designed to take this kind of load (especially when running full) and the discharge channel erosion gully is removing support from under the pipe as it erodes (due especially to the fact that there is a curve in the discharge channel alignment) (Photo 6).

b. Design and Construction Data

No design computations were uncovered during the report preparation phase. Seepage and stability analyses fitting the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available. No embankment or foundation soil parameters are available for carrying out a conventional stability analysis on the embankment. No construction data or specifications relating to the degree of embankment compaction are available for use in a stability analysis.

c. Operating Records

No operating records are available relating to the stability of the dam or appurtenant structures. The water level on the day of inspection was near the crest of the principal spillway, and according to Mr. Schneider, the reservoir remains close to full at all times. A 1-1/4-inch diameter low level drain is the only operating facility provided for this dam.

d. Post Construction Changes

No post construction changes exist which will affect the structural stability of the dam.

However, the principal spillway conduit was placed in its position, approximately, 30 feet right of the emergency spillway centerline, five years after construction of the dam. It was placed without the construction of seepage collars.

Also, three years after construction of the dam, the emergency spillway was moved from the right abutment to the left abutment in order to accommodate another lake immediately adjacent to A.C. Schneider Lake; a culvert was installed connecting the two lakes (See 1.2.g).

e. Seismic Stability

The dam is located in Seismic Zone 1, as defined in "Recommended Guidelines For Safety Inspection of Dams" as prepared by the Corps of Engineers, and will not require a seismic stability analysis. An earthquake of the magnitude which would be expected in a Seismic Zone 1 will not cause distress to a well designed and constructed earth dam. Available literature indicates that no active faults exist near the vicinity of the damsite.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment

The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the Phase I investigation is intended to identify any need for such studies.

It should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team.

It is also important to note that the condition of a dam depends upon numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be assurance that an unsafe condition could be detected.

a. Safety

The spillway capacity of A.C. Schneider Lake Dam is found to be "Seriously Inadequate". The spillway/reservoir system of A.C. Schneider Lake Dam and the adjacent dam will accommodate approximately 5 percent of the PMF without overtopping A. C. Schneider Lake Dam. The surface soils in the embankment and the emergency spillway appears to be a sand-silt mixture. The dam is overtopped by over 2 feet during the

occurrence of the PMF. The maximum velocity of flow in the emergency spillway during PMF will be about 7 ft/sec. The velocity in the emergency spillway will thus exceed the permissible velocity of 5 ft/sec (Kentucky Blue Grass-sandy silt). The dam would also be susceptible to erosion due to high velocity of flow on its downstream slope, due to overtopping of the dam during the occurrence of the PMF.

No quantitative evaluation of the safety of the embankment can be made in view of the absence of seepage and stability analyses. The present embankment, however, has reportedly performed satisfactorily since its construction without failure or evidence of instability. Reportedly, the dam has never been overtopped and there was no evidence indicating the contrary.

The safety of the dam can be improved if the observed deficiencies are remedied as described in Section 7.2 and the dam is properly maintained in the future.

The spillway system generally appears to be functioning properly, however, remedial measures described in Section 7.2b could improve its structural adequacy.

b. Adequacy of Information

Information relating to the design and construction of the dam is lacking. The conclusions presented in this report are based on field measurement, past performance and present condition of the dam. Information on the design hydrology, hydraulic design, and the operation and maintenance of the dam were not available. Seepage and stability analyses fitting to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency.

c. Urgency

The remedial measures recommended in Paragraph 7.2 should be accomplished within a reasonable period of time. The items recommended in Paragraph 7.2.a should be pursued on a high priority basis.

d. Necessity for Phase II Inspection

Based on results of the Phase I inspection, a Phase II inspection is not felt to be necessary. However, the measures recommended in Paragraph 7.2 should be undertaken within a reasonable period of time.

7.2 Remedial Measures

a. Alternatives

There are several general options which may be considered to reduce the possibility of dam failure or to diminish the harmful consequences of such a failure. Some of these options are:

1. Increase the spillway capacity to pass the Probable Maximum Flood without overtopping the dam.

2. Increase the height of the dam enough to pass the PMF without overtopping the dam: an investigation should also be done that includes studying the effects on the structural stability of the existing embankment and the emergency spillway. The overtopping depth during the occurrence of the PMF, stated in Section 5.1d, is not the required or recommended increase in the height of the dam.

3. A combination of 1 and 2 above.

b. O & M Procedures

1. The erosion gully along the downstream right embankment/abutment contact should be backfilled with a suitable material and proper compaction attained. The damaged area should be properly protected from further erosional discharges through the emergency spillway; and/or the discharges through the emergency spillway should be rechanneled away from the embankment and embankment/abutment contact.

2. Remove the trees from the downstream and upstream slopes of the dam. Removal of large trees should be under the guidance of an engineer experienced in the design and construction of earthen dams.

3. The erosion due to wave action on the upstream slope should be monitored and if the erosion continues, protective measures should be employed to protect the slope from further damage.

4. The area in and around the principal spillway inlet should be cleared of any brush, debris, or grass and maintained in this cleared condition.

5. The principal spillway outlet pipe should in some way be supported or braced in order to relieve the present cantilevered condition to the extent that it is unaffected by vibratory stresses when flowing under head.

6. The emergency spillway discharge channel appears to be serving a two-fold purpose: (a) to channel the excess flow not taken by the principal spillway to the downstream channel, and, (b) to direct the runoff from nearby slopes above the dam into the downstream channel. Therefore, the eroded gully part of the emergency spillway discharge channel should be properly repaired and a larger semi-circular swale or a different shape could be created in its place, properly protected, e.g. with a grass cover. The runoff from the adjacent slopes should be rechanneled with some kind of a berm or in some other way in order to insure that it does not run off within the confines of the dam or its abutment contact areas, either upstream or downstream.

7. Seepage and stability analyses should be performed by a professional engineer experienced in the design and construction of earth dams.

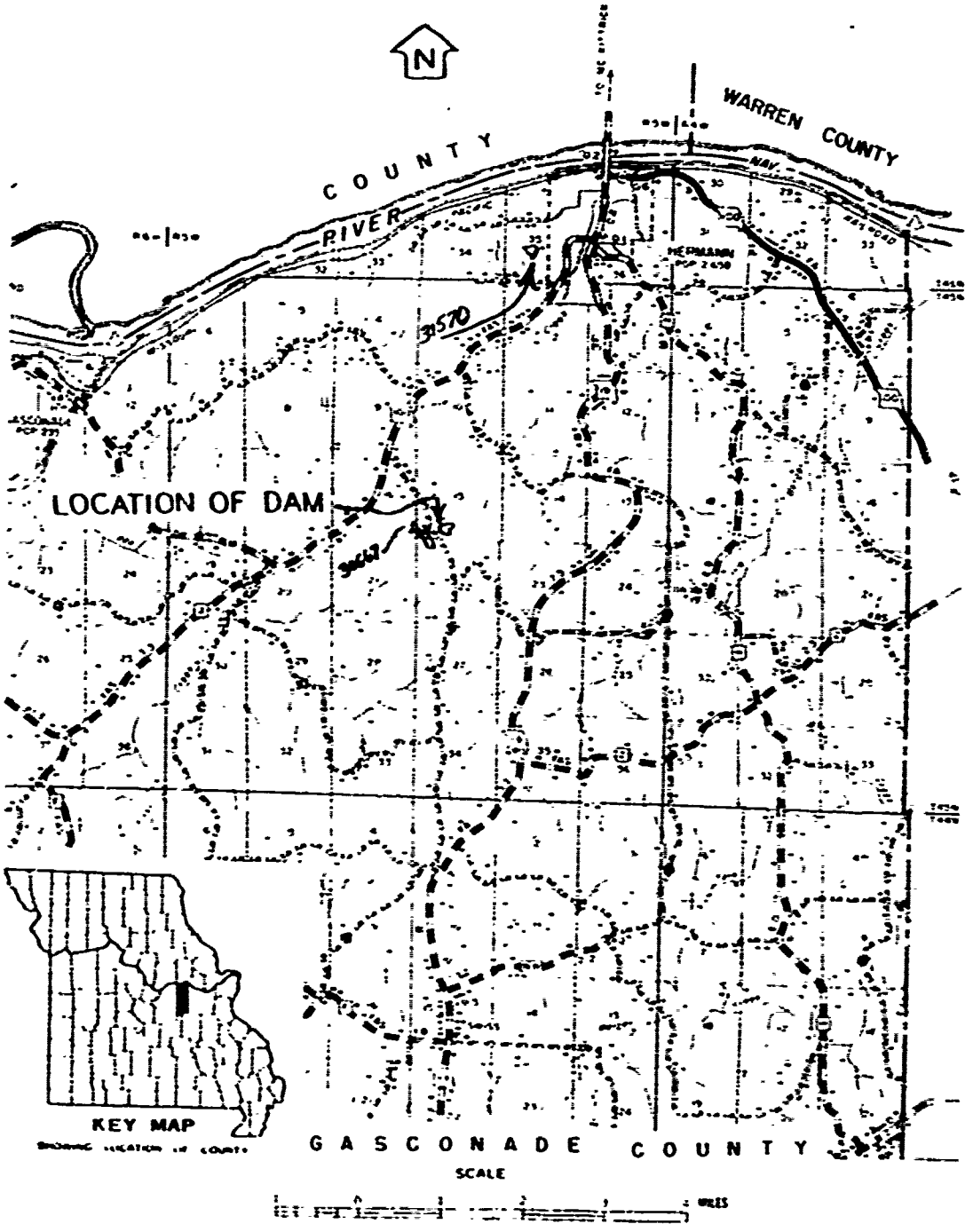
8. The owner should initiate the following programs:

   (a) Periodic inspection of the dam by a professional engineer experienced in the design and construction of earthen dams.

   (b) Set up a maintenance schedule and log all visits to the dam for operation, repairs and maintenance.

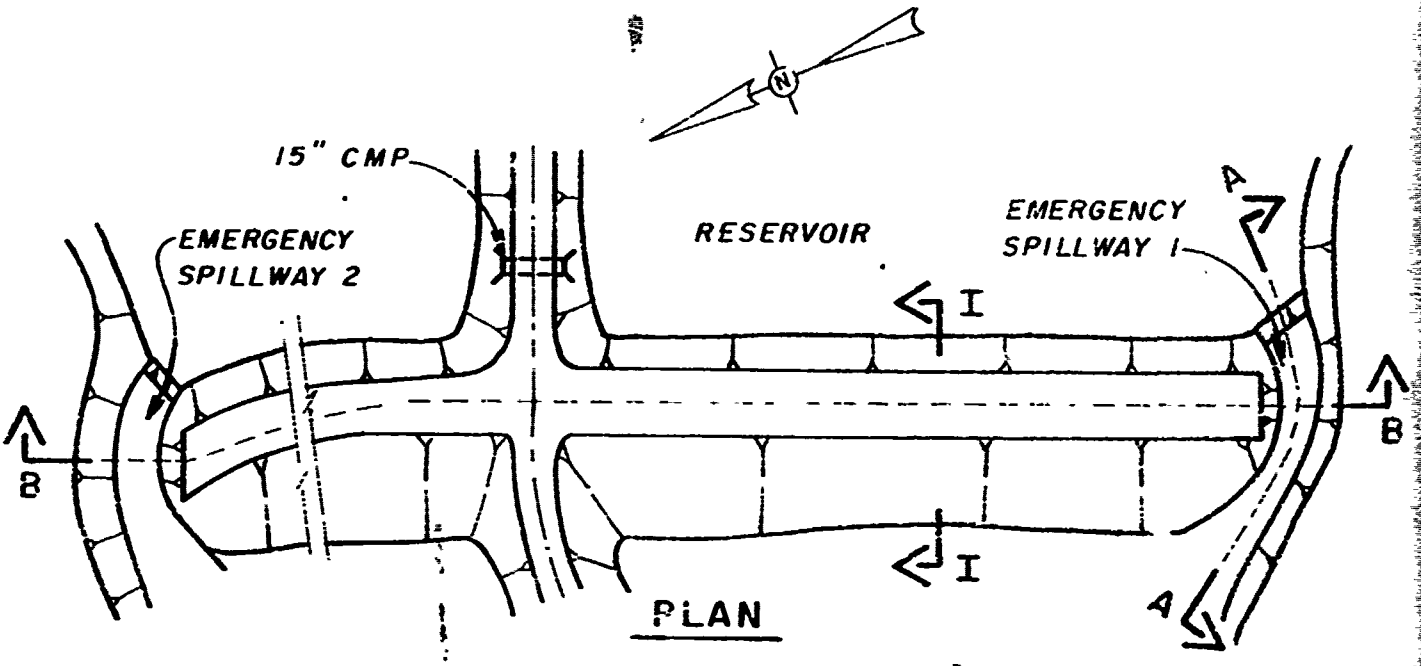
PLATES

PLATE 1

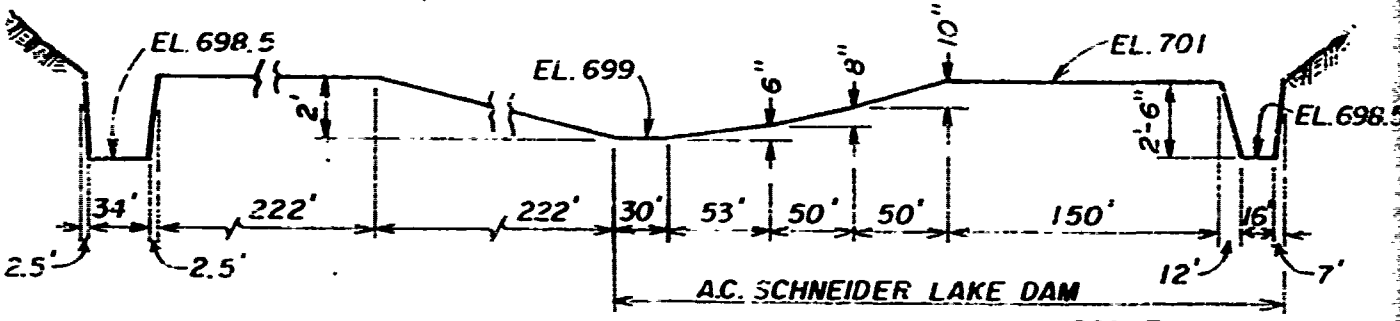


LOCATION MAP - A.C. SCHNEIDER LAKE DAM

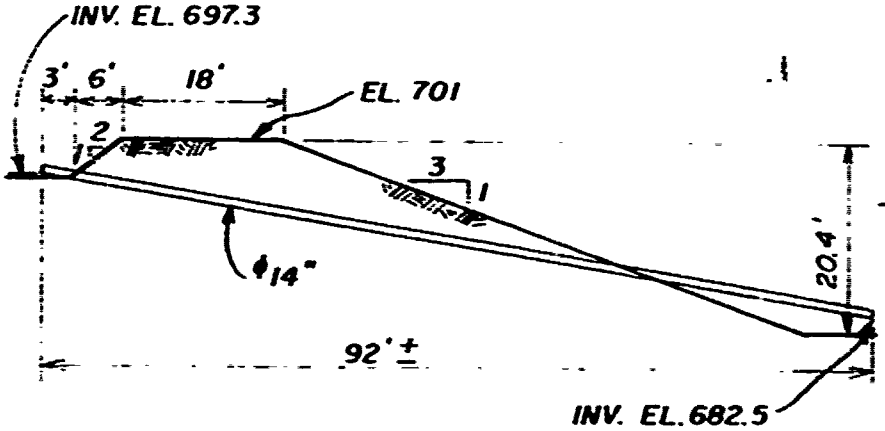
MO 31563



PLAN

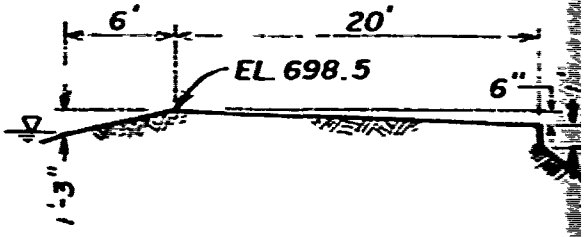


SCALE:
HORIZ. 1" = 100'
VERT. 1" = 60'



SECTION I-I
PRINCIPAL SPILLWAY

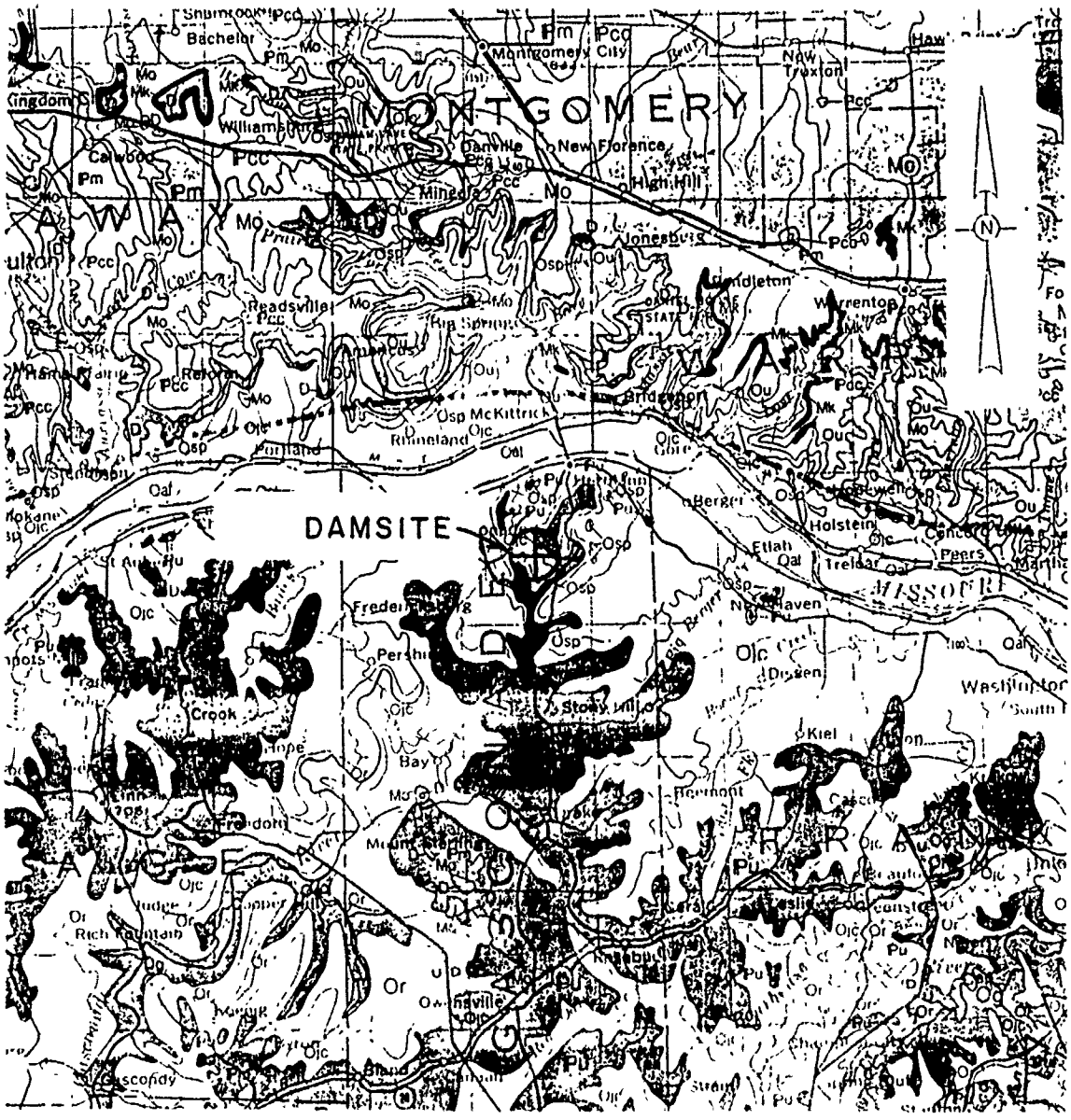
SCALE 1" = 20'



SECTION A-A

SCALE 1" = 10'

A.C. SCHNEIDER LAKE DAM (MO. 31563)
AND ADJACENT DAM
PLAN AND SECTIONS



SCALE

10 0 10 20 30 40 Miles

⊕ LOCATION OF DAM

NOTE LEGEND OF THIS DAM IS ON PLATE 4

REFERENCE:

GEOLOGIC MAP OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI GEOLOGICAL SURVEY
KENNETH H ANDERSON, 1979

REGIONAL GEOLOGICAL MAP OF A. C. SCHNEIDER LAKE DAM

LEGEND

PERIOD	SYMBOL	DESCRIPTION
QUATERNARY	Qal	ALLUVIUM: SAND, SILT, GRAVEL
PENNSYLVANIAN	Pu	PENNSYLVANIAN UNDIFFERENTIATED
	Pm	MARMATON GROUP: CYCLIC DEPOSITS OF SHALE, LIMESTONE AND SANDSTONE
	Pcc	CHEROKEE GROUP: CYCLIC DEPOSITS OF SHALE, LIMESTONE AND SANDSTONE
MISSISSIPPIAN	Mm	ST. LOUIS FORMATION: LIMESTONE INTERBEDDED WITH SHALE.
	Mm	SALEM FORMATION: LIMESTONE INTERBEDDED WITH SHALE AND SILTSTONE
	Mm	WARSAW FORMATION: ARGILLACEOUS LIMESTONE AND CALCAREOUS SHALE
	Mo	KEOKUK- BURLINGTON FORMATION: CHERTY GRAYISH BROWN SANDY LIMESTONE
	Mk	NORTHVIEW- COMPTON AND BACHELOR FORMATION
DEVONIAN	D	CHATTANOOGA SHALE, SYLAMORE SANDSTONE
ORDOVICIAN	Omk	MAQUOKETA SHALE, KIMMSWICK LIMESTONE
	Odp	DECORAH FORMATION: GREEN TO GRAY CALCAREOUS SHALE WITH THIN FOSSILIFEROUS LIMESTONE
	Osp	ST PETER SANDSTONE
	Ojc	SMITHVILLE FORMATION POWELL DOLOMITE
	Or	ROUBIDOUX FORMATION

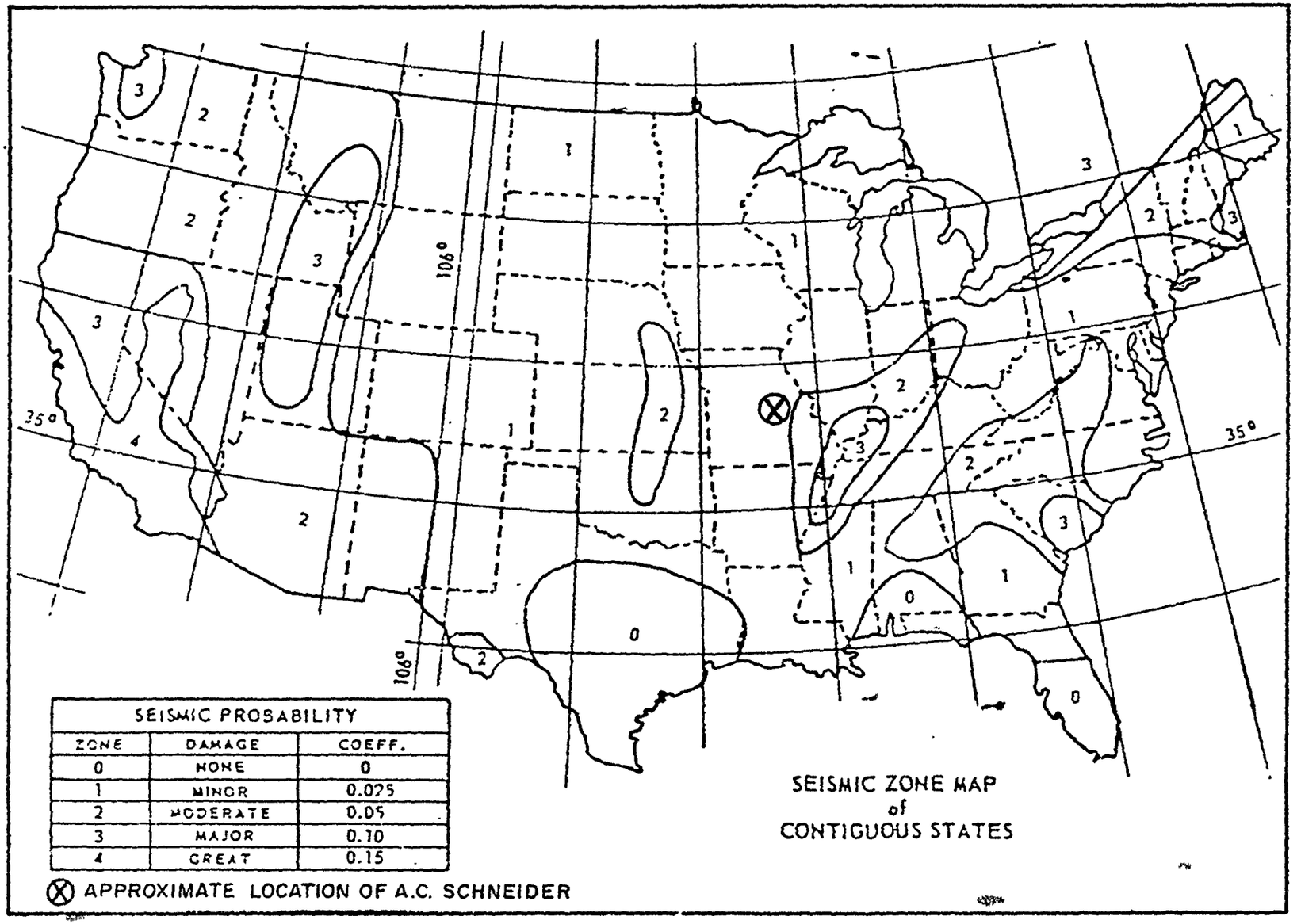

106°
106°
35°
35°
SEISMIC PROSABILITY
ZONE | DAMAGE | COEFF.
0 | NONE | 0
1 | MINOR | 0.025
2 | MODERATE | 0.05
3 | MAJOR | 0.10
4 | GREAT | 0.15
⊗ APPROXIMATE LOCATION OF A.C. SCHNEIDER
SEISMIC ZONE MAP
of
CONTIGUOUS STATES

PLATE 5

APPENDIX A

PHOTOGRAPHS

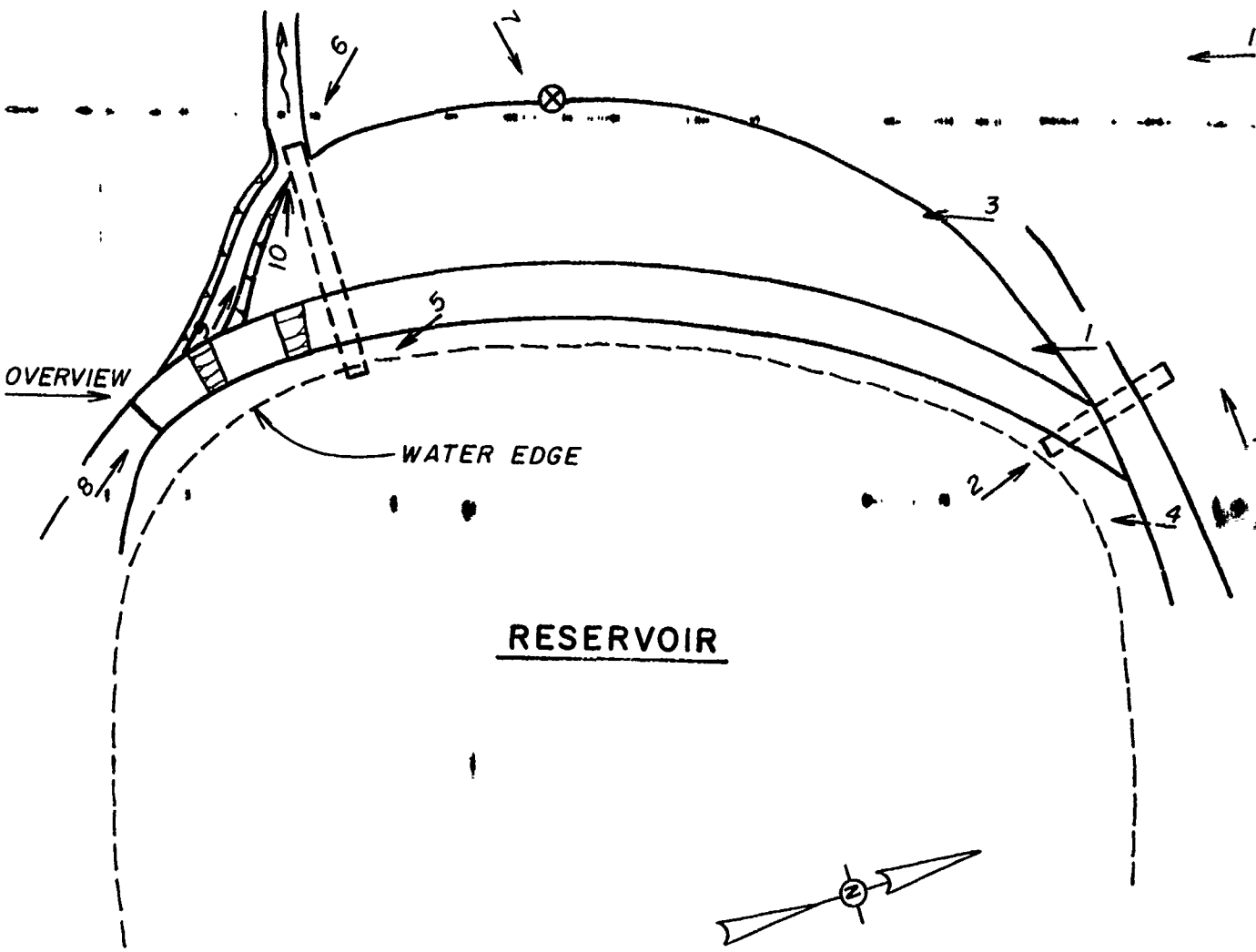


PHOTO INDEX FOR A. C. SCHNEIDER LAKE DAM

A.C. Schneider Lake Dam

Photographs

Photo 1 - Top of dam showing driveway road along right abutment contact and grass protection.

Photo 2 - View of conduit under road between A.C. Schneider Lake and adjacent lake.

Photo 3 - Downstream slope of dam showing grass cover protection, trees, and brush growth.

Photo 4 - Upstream slope of dam showing freeboard, brush growth, and grass protection.

Photo 5 - View of principal spillway inlet, showing brush growth in vicinity.

Photo 6 - Principal spillway outlet into downstream creek showing runoff gully from emergency spillway and 30-foot pipe free length.

Photo 7 - View of low-level outlet at toe of embankment.

Photo 8 - View of emergency spillway inlet area on top of dam; reservoir to the right.

Photo 9 - View looking downward at runoff gully towards principal spillway outlet, from emergency spillway inlet area.

Photo 10 - View of downstream channel.

Photo 11 - View of barn or shed below dam.

Photo 12 - View of property and road below dam.

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

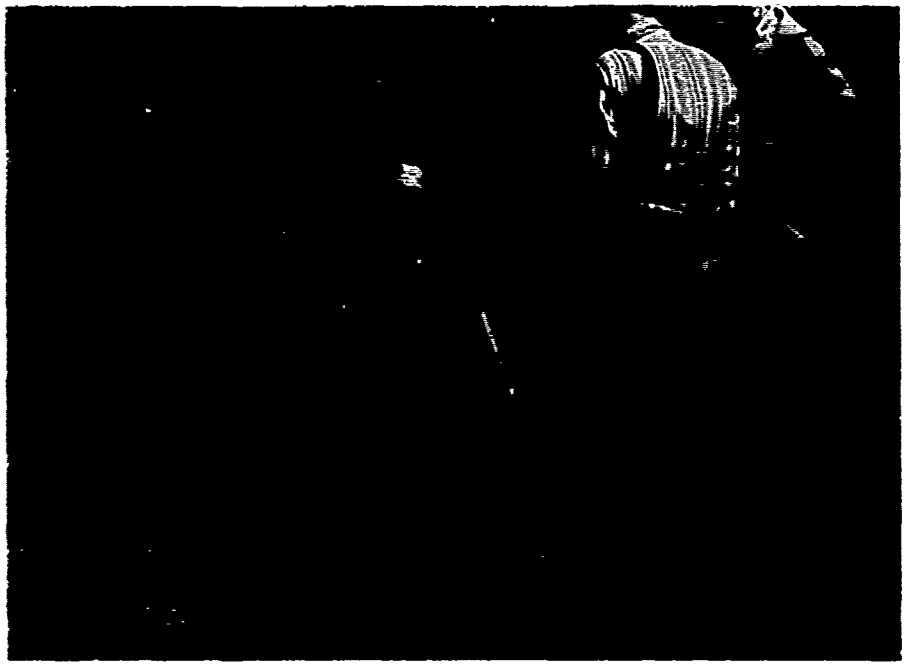


Photo 7

Photo 8

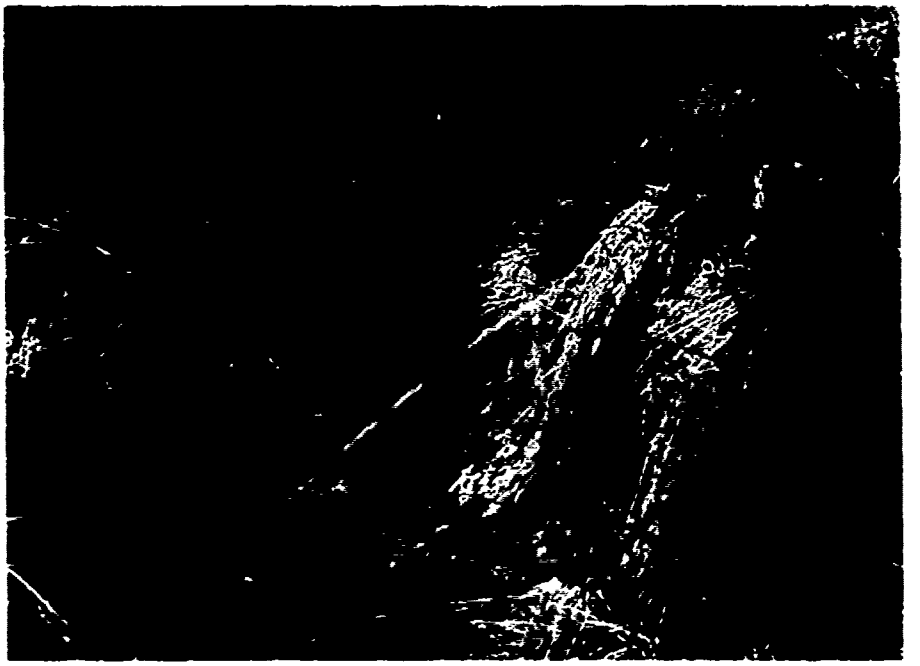


Photo 9

Photo 10

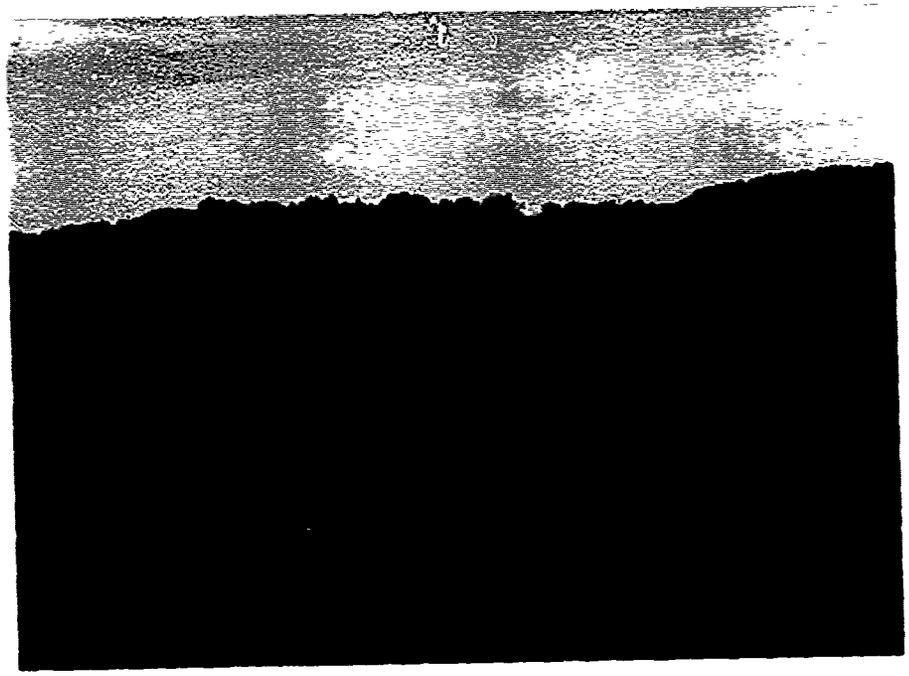


Photo 11

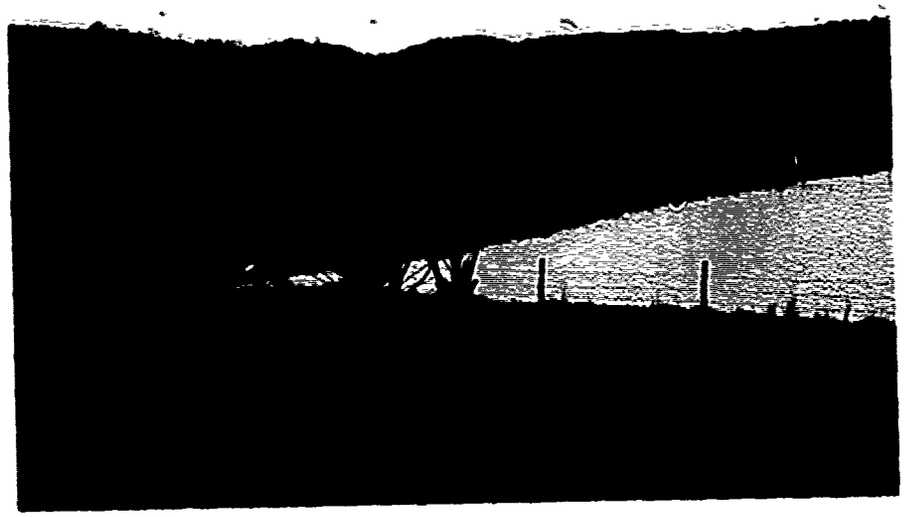
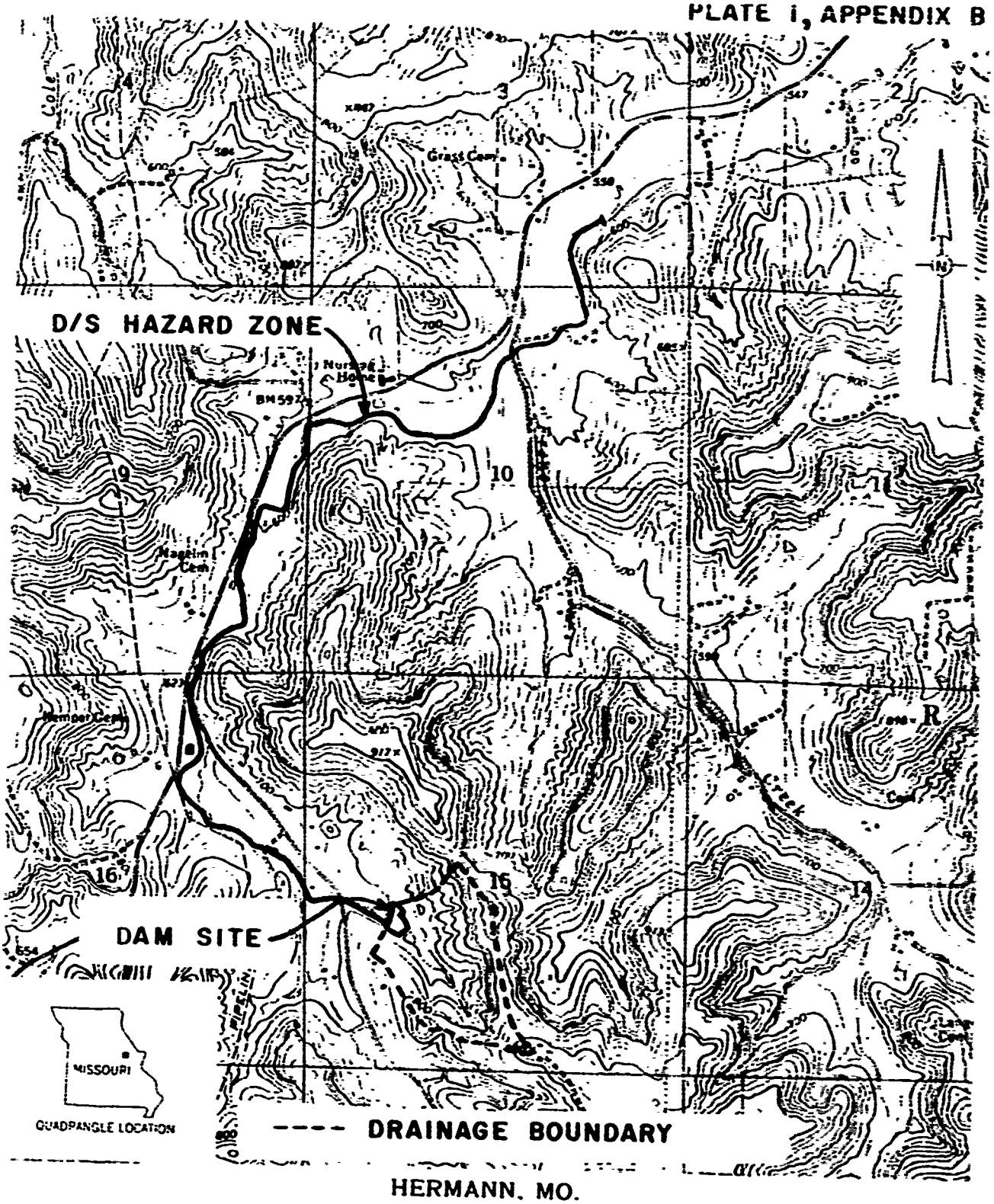


Photo 12

APPENDIX B

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

PLATE 1, APPENDIX B



HERMANN, MO.

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 5 FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

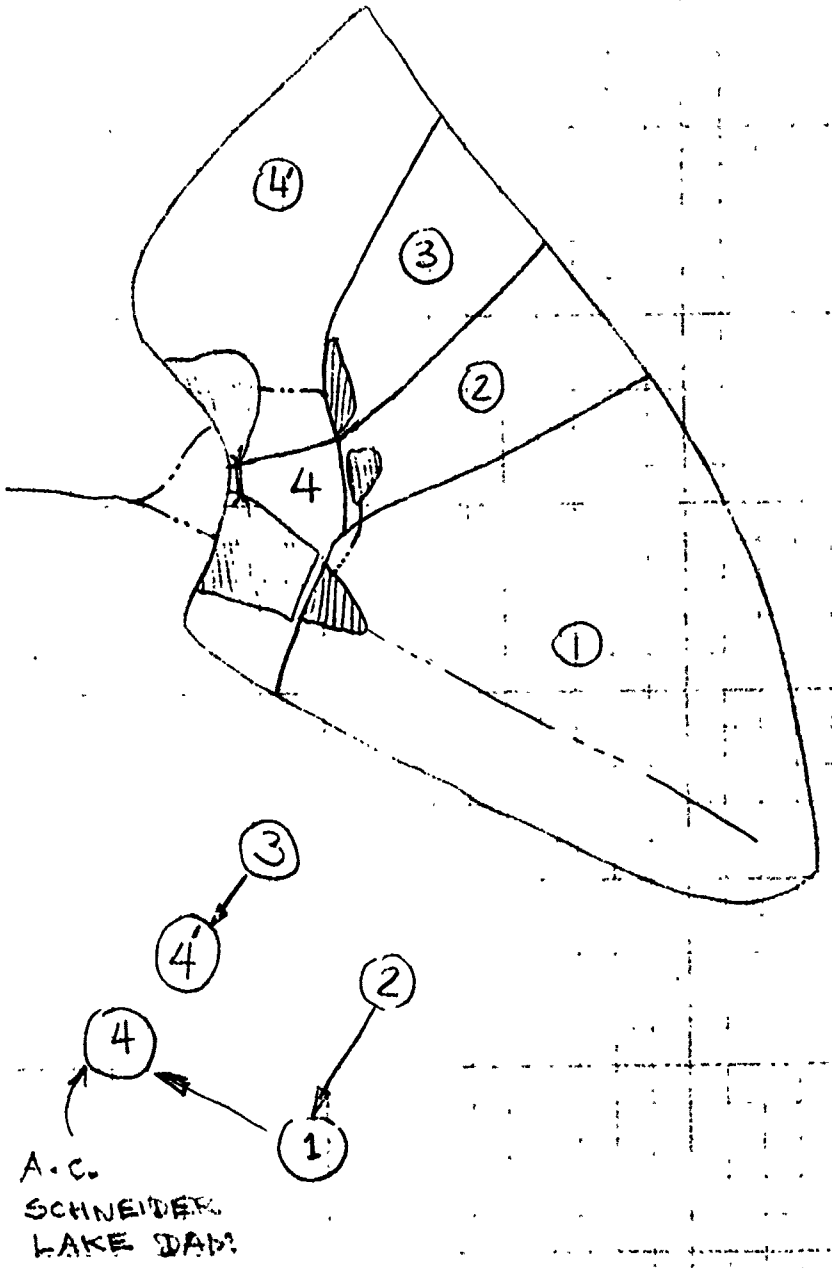
A. C. SCHNEIDER LAKE DAM (MO. 31563)
DRAINAGE BASIN

ECI-4 **PRC ENGINEERING CONSULTANTS, INC.**

DAM SAFETY INSPECTION - MISSOURI — SHEET NO 1 OF 1

A C SCHNEIDER LAKE DAM - (MO 31563) — JOB NO. 1263

DRAINAGE PATTERN OF SIGNIFICANT U/S DAMS — BY J.C DATE 6-16-80



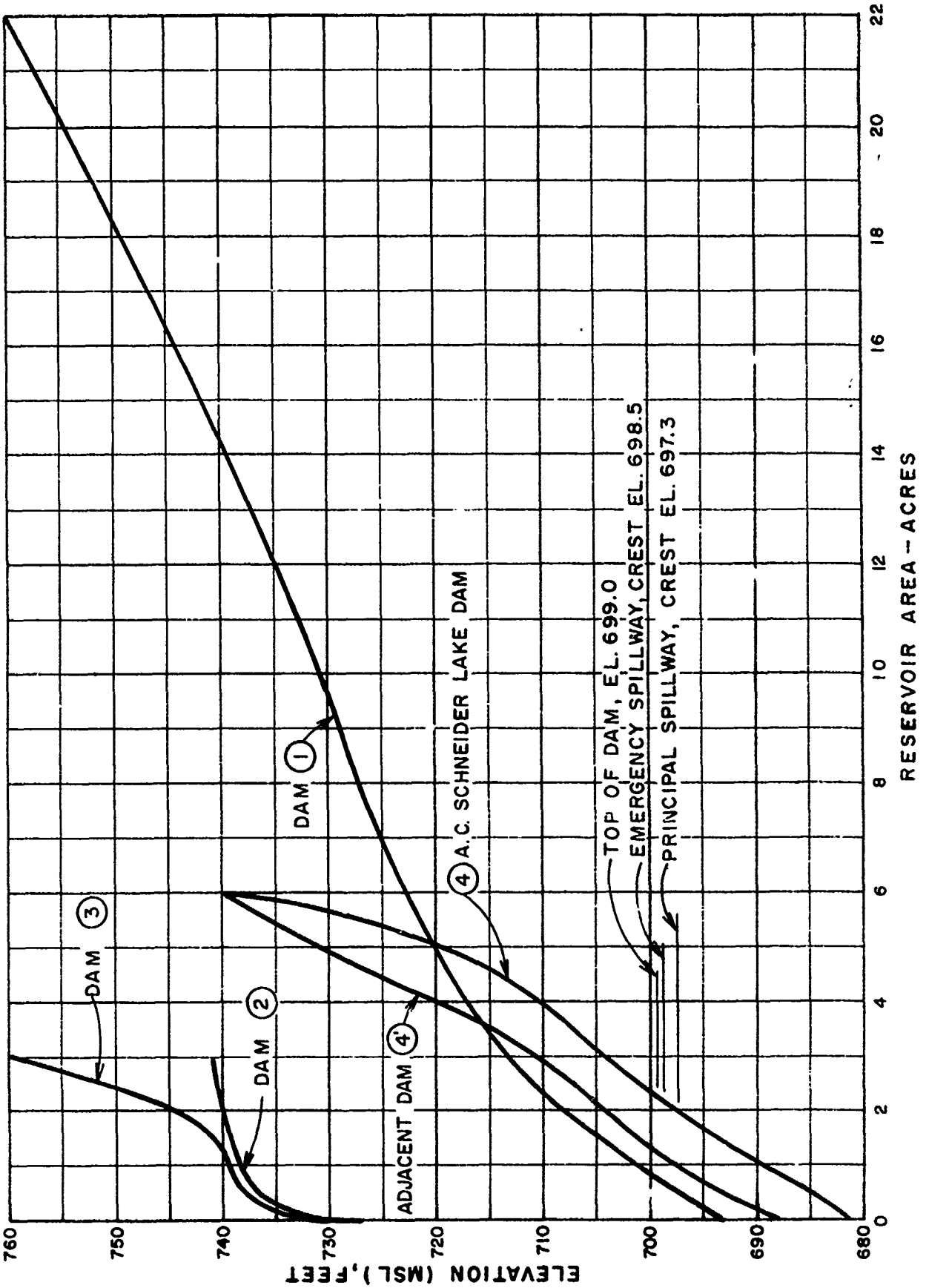
PRC ENGINEERING CONSULTANTS, INC.

DAM SAFETY INSPECTION - MISSOURI SHEET NO. ____ OF ____

DAM NAME: A.C. SCHNEIDER LAKE DAM / ID NO.: 31563 JOB NO. 1263

RESERVOIR ELEVATION - AREA DATA BY JFK DATE 10/1/80

ELEV. (M.S.L.) (Ft.)	RESERVOIR SURFACE AREA (Acres)	REMARKS
681	0	Estimated Streambed Elev. U/S of Dam
688	1	Interpolated from Graph
697.3	2	Principal Spillway Crest
698.5	2.3	Emergency Spillway Crest
699	2.4	Top of Dam
710	4	Interpolated from Graph
720	5	Measured on USGS Quad
740	6	Measured on USGS Quad



A. C. SCHNEIDER LAKE DAM (MO.31563),
ADJACENT DAM AND U/S DAMS
RESERVOIR ELEVATION-AREA CURVES

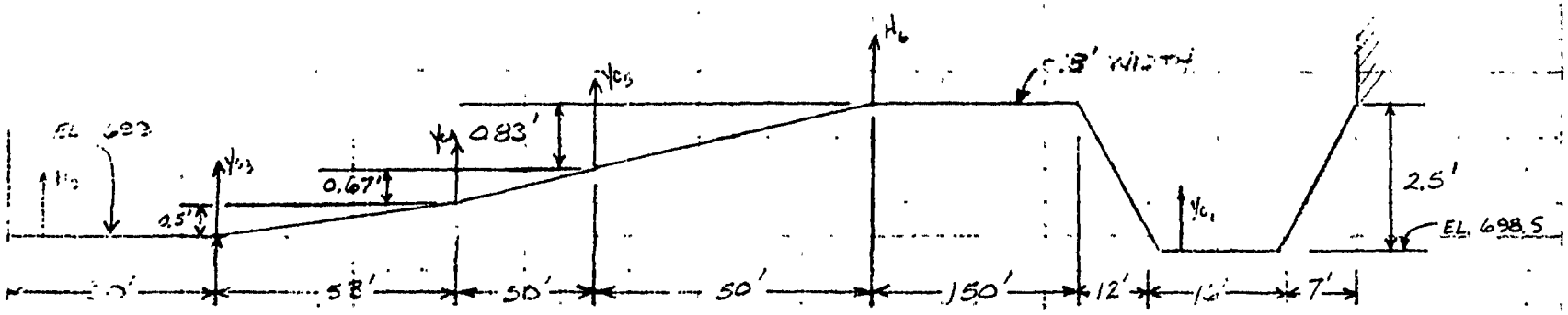
EC1-4

PRC ENGINEERING CONSULTANTS, INC.

DAM SAFETY INSPECTION / NISSWA, 1980 SHEET NO. 1 OF 8

A.C. SCHNEIDER LAKE DAM (MO. 31565) JOB NO. 1262

EMERGENCY SPILLWAY AND OVERTOP RATING CURVE BY JFK DATE 10/1/80



Y_{c_1}	A_{c_1}	T_{c_1}	V_{c_1}	$\frac{V_{c_1}^2}{2g}$	$Q_{c_1}=V_{c_1}A_{c_1}$	W.S.EL $=Y_{c_1}+\frac{V_{c_1}^2}{2g}+$ 698.5	H_2	C_{w_2}	L_2	$Q_2=C_{L_2}L_2H_2^{1.5}$	Y_{c_3}	T_{c_3}	A_{c_3}	$Q_{c_3}=\sqrt{\frac{A_{c_3}^3 g}{T}}$	Y_{c_4}	T_{c_4}	A_{c_4}	$Q_{c_4}=\sqrt{\frac{A_{c_4}^3 g}{T}}$
0	0	0	0	0	0	698.5	—				—				—			
1	3.8	3.6	5.2	.42	102.9	699.?	.9	3.02	30	77.2	0.7	53	23.9	90.8	0.34	25.2	4.23	9.9
1.2	18.05	19.8	3.8	.23	34.2	699.2	.2	2.97	30	8.0	—				—			
1.5	22.0	27.4	6.2	.59	201.3	700.6	1.6	3.04	30	184.6	1.14	53	47.2	252.5	0.84	50	25.2	101.6
1.7	38.2	28.9	6.5	.66	249.1	700.9	1.9	3.04	30	238.9	1.35	53	58.3	347.0	1.05	50	37.3	154.2
2.	47.2	31.2	7.0	.76	329.4	701.3	2.3	3.04	30	318.1	1.59	53	71.0	466.5	1.29	50	47.6	263.3
2.3	56.9	33.5	7.4	.85	421.1	701.6	2.6	3.05	30	383.6	1.82	53	83.0	589.8	1.51	50	58.8	361.4
2.6	68.8	35	7.7	.91	485.2	701.9	2.9	3.05	30	451.9	2.02	53	93.8	708.2	1.72	50	69.2	462.2
3	81.2	35	8.7	1.16	706.5	702.7	3.7	3.06	30	682.3	2.52	53	120.5	1031.0	2.22	50	94.2	784.0

Y_{c_5}	T_{c_5}	A_{c_5}	$Q_{c_5}=\sqrt{\frac{A_{c_5}^3 g}{T}}$	H_6	C_6	L_6	$Q_6=C_6L_6H_6^{1.5}$	Q_{TOTAL}
—				—				0
—				—				281
—				—				42
0.34	70.10	3.39	7.9	—				748
0.49	293	7.2	20.2	—				1010
0.87	50	22.5	85.5	0.3	3.00	150	739	1537
1.1	50	33.8	157.9	0.6	3.02	150	2105	2124
1.3	50	44.7	235.5	0.9	3.03	150	388.4	2784
1.5	50	69.1	461.0	1.7	3.04	150	1010.7	4593

Check assumption for dam 4.

$S = \frac{.5}{20} = .025 \qquad n = .03$

for $y_c = 1$

$$S_c = \left[\frac{Q_c n}{1.49 A R_H^{2/3}}\right]^2 = \left[\frac{1029(.03)}{1.49(19.8)\left(\frac{19.8}{23.6}\right)^{2/3}}\right]^2 = .014 < .025 \text{ ok}$$

for $y_c = 2$.

$$S_c = \left[\frac{329.4(.03)}{1.49(47.2)\left(\frac{47.2}{31.2}\right)^{2/3}}\right]^2 = .011 < .025 \text{ ok}$$

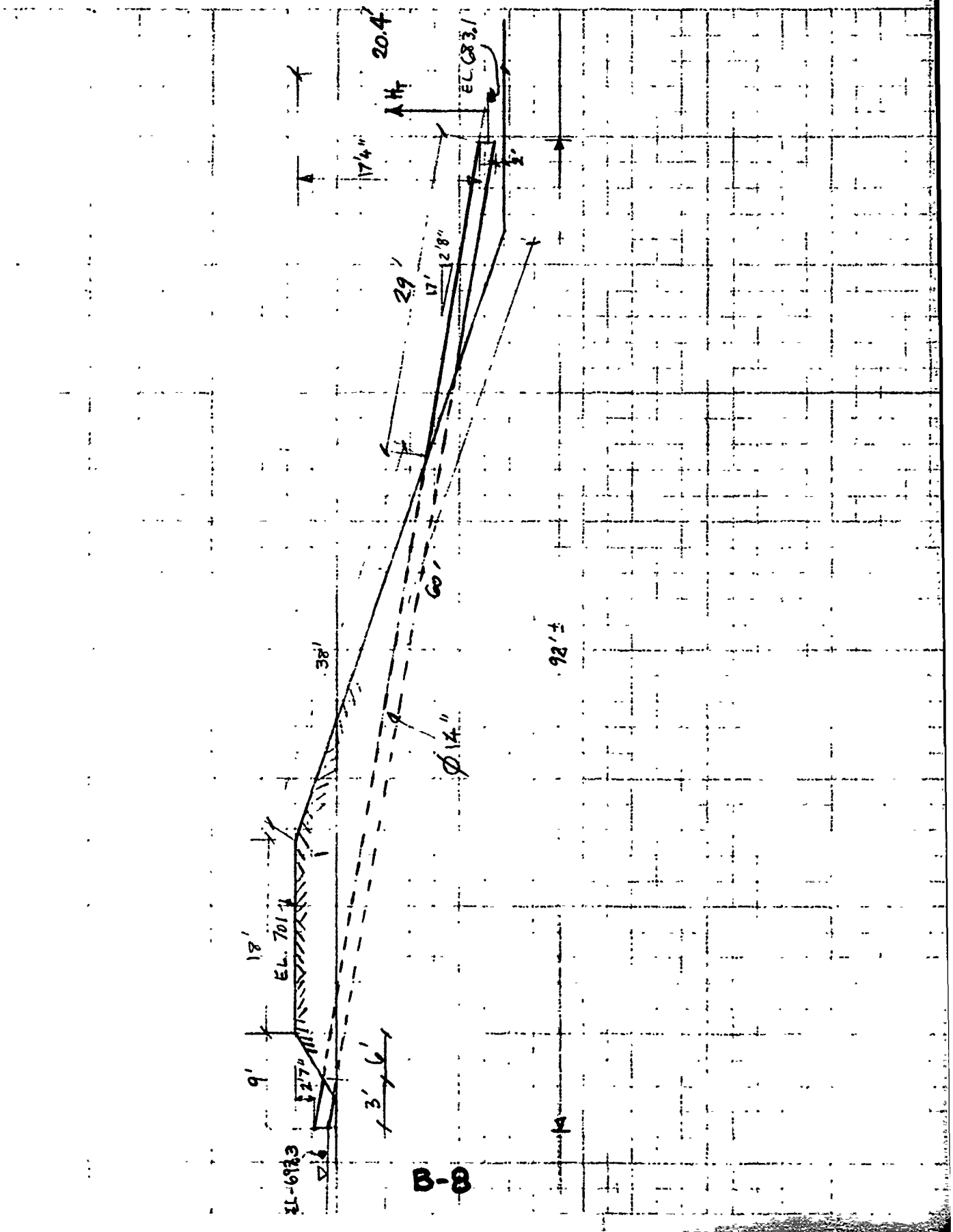
∴ Flow will be supercritical in the emergency spillway.

ECI-4 **PRC ENGINEERING CONSULTANTS, INC.**

DAM SAFETY INSPECTION - MISSOURI — SHEET NO. 3 OF 8

DC SCHNEIDER LAKE DAM, (MO 31563) AND ADJACENT DAM — JOB NO. 1263

CROSS SECTION OF PRINCIPAL SPILLWAY — BY DC DATE 6-17-82



GIVEN: Hooded Inlet Culvert Spillway
D = 14", Welded Steel Conduit
L = 92'±

ASSUME:
n = 0.012

REQ'D: Stage-Discharge Curve:

SOLN:

① For values of head in the range $0 \leq \frac{h}{D} \leq 1.1$ the inlet controls the discharge:

Res. W.S. Elevation (M.S.L)	h (Ft)	$\frac{h}{D}$	$\frac{Q}{D^{5/2}}$	Q cfs
697.3	0	0	0	0
698.0	0.7	0.6	0.88	1.30
698.5	1.2	1.03	2.29	3.4
698.58	1.28	1.10	2.50	3.7

② Determine the value of $\frac{h}{D}$ at which full pipe flow starts:

$M = 1 + K_e + K_p L$

Assume, $K_e = 1.0$

$K_p = \frac{5087 n^2}{d_i^{16/3}} (92) = \frac{5087 \times (.012)^2}{(14)^{16/3}} (92) = 2.0$

$M = 1+1+2 = 4$

$$\left(\frac{Q}{D^{5/2}}\right)^2 - \frac{0.992}{M}\left(\frac{Q}{D^{5/2}}\right) - \frac{39.68}{M}\left(0.529 + \frac{Z}{D}\right) = 0$$

$Z = 682.5 \quad 697.3 = 11.2'$

$$\left(\frac{Q}{D^{5/2}}\right)^2 - 0.248\left(\frac{Q}{D^{5/2}}\right) - 100.57 = 0$$

$$\Rightarrow \frac{Q}{D^{5/2}} = 10.15 \Rightarrow \underline{\underline{Q = 15 \text{ cfs}}}$$

$$\frac{h}{D} = 1.1 + .025\left(\frac{Q}{D^{5/2}} - 2.5\right)$$

$$= 1.1 + .025\,(10.15 - 2.5) = 1.29$$

Thus full pipe starts at $\frac{h}{D} = 1.29$ which places reservoir W.S. at Elev. 698.8

Thus Q increases linearly from 3.7 cfs at elevation 698.58 to 15 cfs at elevation 698.8.

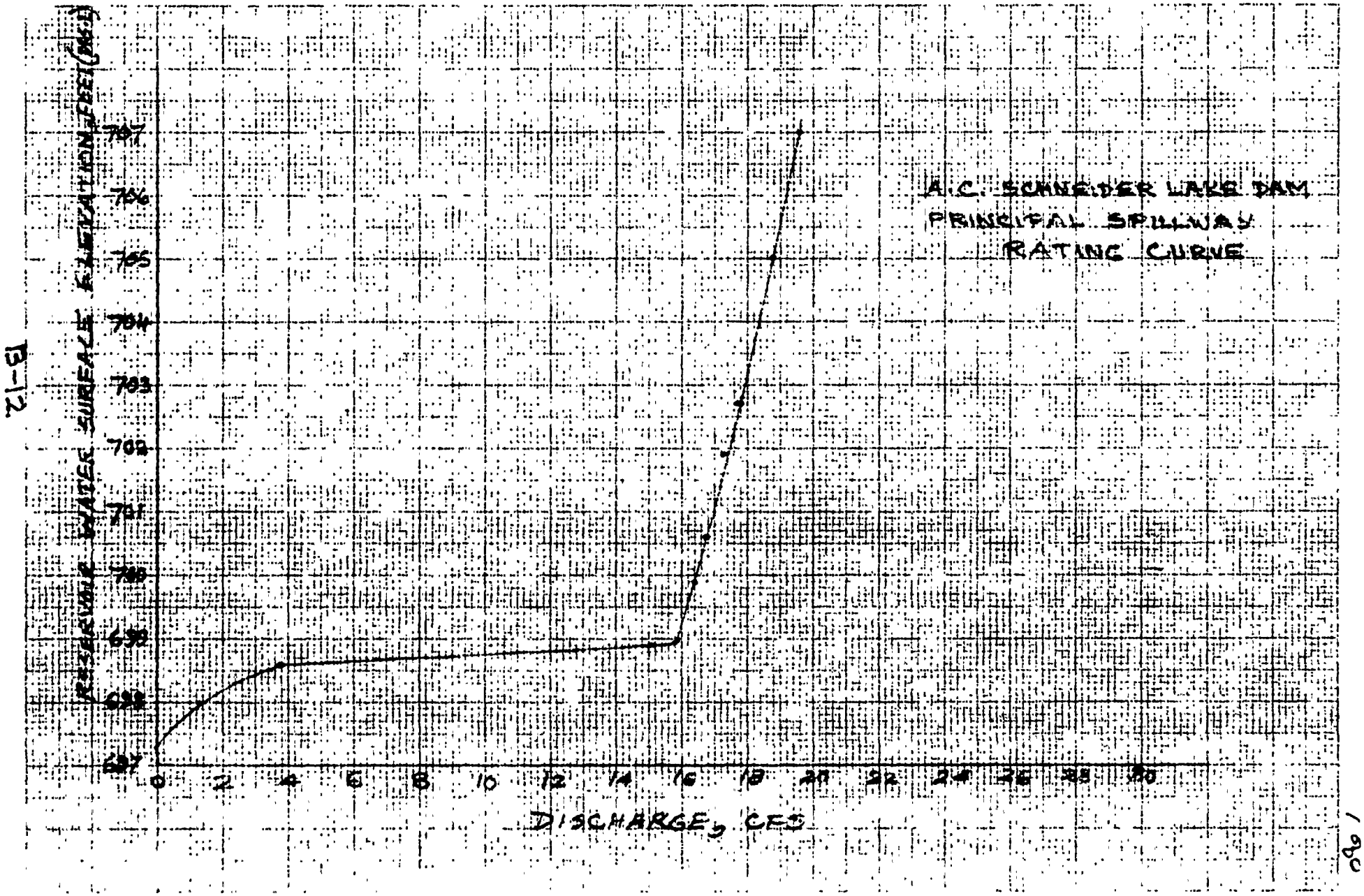
(3) Full pipe flow:

Full-pipe flow exists for values of Q greater than 15 cfs. The total head H_T is effective in producing discharge under full pipe flow conditions.

$$H_T = M\frac{V^2}{2g} = 4\frac{V^2}{2g}$$

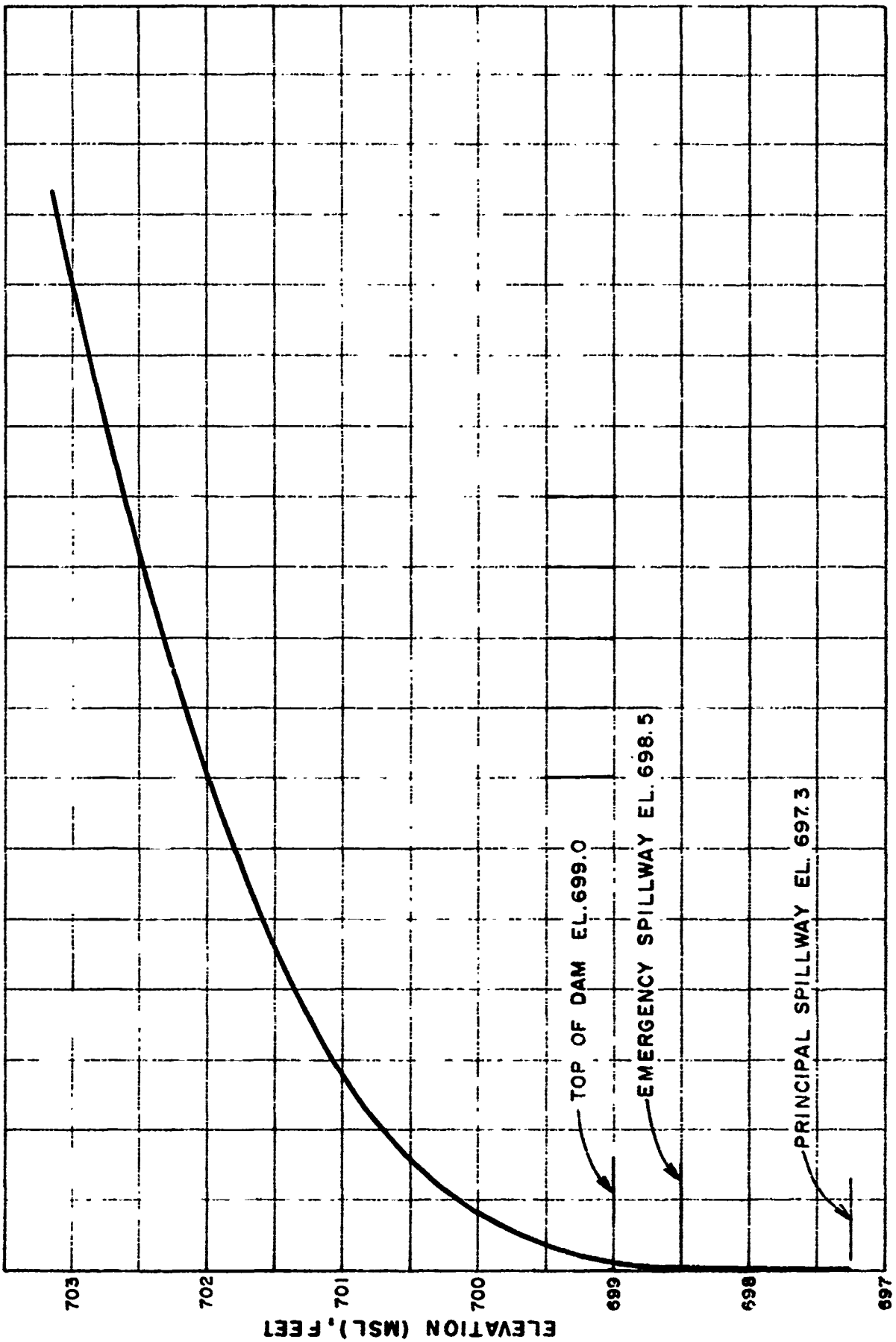
$$\Rightarrow Q = 4\sqrt{H_T} = 4\sqrt{\text{U/S W.S. Elev.} - 683.1}$$

U/S. W.S. Elev. (M.S.L)	Q cfs
698.8	15
699.0	15.9
699.9	16.4
700.6	16.7
700.9	16.9
701.3	17.1
701.6	17.2
701.9	17.3
702.7	17.7
707.0	19.6

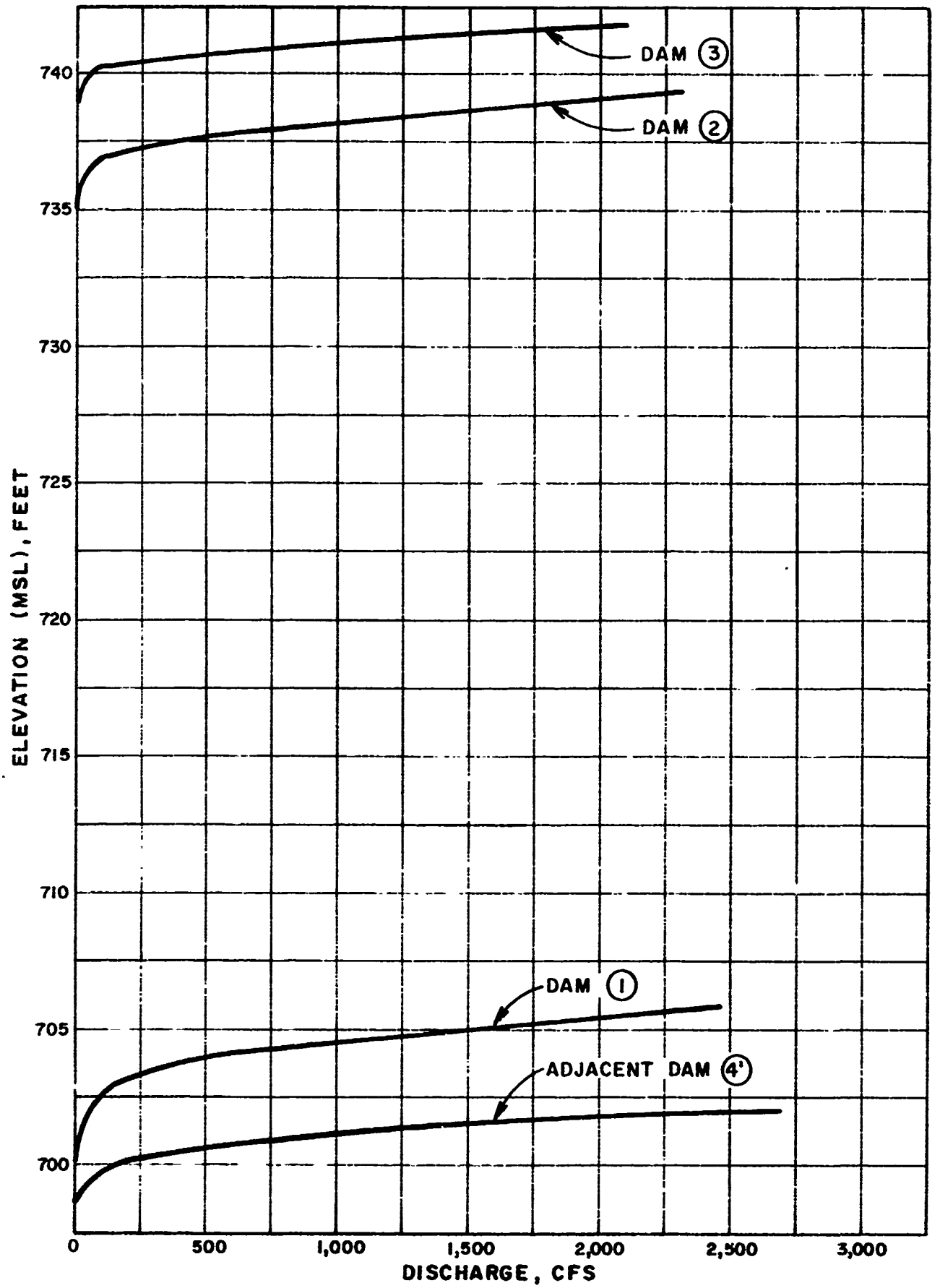

A.C. SCHNEIDER LAKE DAM
PRINCIPAL SPILLWAY
RATING CURVE
RESERVOIR WATER SURFACE ELEVATION, FEET (MSL)
DISCHARGE, CFS
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30

Reservoir W.S. Elev. (M.S.L.)	$Q_{PRIN\ SPLWY}$ (cfs)	$Q_{OVERTOP+E.\ SPLWY}$ (cfs)	Q_{TOTAL} (cfs)
697.3	0	0	0
698.0	1.3	0	1.3
698.5	3.4	0	3.4
698.58	3.7	1	4.7
698.8	15	8	23
699.0	15.9	17	34
699.9	16.4	281	297
700.6	16.7	748	765
700.9	16.9	1010	1027
701.3	17.1	1537	1554
701.6	17.2	2124	2141
701.9	17.3	2734	2751
702.7	17.7	4593	4611

PLATE 3, APPENDIX B



A. C. SCHNEIDER LAKE DAM (MO. 31563)
SPILLWAY & OVERTOP RATING CURVE



U/S DAMS TO A.C. SCHNEIDER LAKE DAM (MO.31563)
AND ADJACENT DAM
SPILLWAY & OVERTOP RATING CURVES

ECI-4 **PRC ENGINEERING CONSULTANTS, INC.**

DAM SAFETY INSPECTION / MISSOURI — SHEET NO. 1 OF 1

DAM NAME: A.C. SCHNEIDER LAKE DAM ④ (MO 31563) — JOB NO. 1263

UNIT HYDROGRAPH PARAMETERS — BY DC JFK — DATE 6-16-80

1) DRAINAGE AREA, $A = 0.012$ sq. mi. $= (7.8$ acres$)$

2) LENGTH OF STREAM, L $(0.20'' \times 2000' = 400')$ $= 0.076$ mi.

3) ELEVATION AT DRAINAGE DIVIDE ALONG THE LONGEST STREAM,
$H_1 = 780$

4) ELEVATION OF RESERVOIR AT SPILLWAY CREST, $H_2 = 697.3$

5) ELEVATION OF CHANNEL BED AT $0.85L$, $E_{85} = 760'$

6) ELEVATION OF CHANNEL BED AT $0.10L$, $E_{10} = 710'$

7) AVERAGE SLOPE OF THE CHANNEL, $S_{AVG} = (E_{85} - E_{10})/0.75L = \frac{760-710}{300} = 16.6\%$

8) TIME OF CONCENTRATION:

A) BY KIRPICH'S EQUATION,

$$t_c = [(11.9 \times L^3)/(H_1 - H_2)]^{0.385} = \left[\frac{11.9 \times .076^3}{82.7}\right]^{.385} < 0.024 \text{ hr}$$

B) BY VELOCITY ESTIMATE,

SLOPE = 16.6% $\Rightarrow$ AVG. VELOCITY = 5 ft/s

$t_c = L/V = 400/5(60)(60) = .022$

USE $t_c = .024$

9) LAG TIME, $t_l = 0.6\, t_c = .0144$

10) UNIT DURATION, $D \leq t_l/3 = .0048$ < 0.083 hr.

USE $D = .083$ ↑ multiples of 5 min.

11) TIME TO PEAK, $T_p = D/2 + t_l = 0.046$

12) PEAK DISCHARGE,

$q_p = (484 \times A)/T_p = 126$ cfs

↑ sq. mi.

EC1-4 **PRC ENGINEERING CONSULTANTS, INC.**

DAM SAFETY INSPECTION / MISSOURI SHEET NO. 1 OF 1

DAM NAME: A.C. Schneider Lake Dam, Adjacent Dam and U/S DAMS JOB NO. 1263

PROBABLE MAXIMUM PRECIPITATION BY DC. DATE 6-16-8

43560 sq ft = 1 acre

DETERMINATION OF PMP

1) Determine drainage area of the basin.

D.A. = 101 Ac = 0.16 sq mile

2) Determine PMP Index Rainfall (for D.A. = 200 sq. mi. & 24 hr. duration)

Location of centroid of basin,

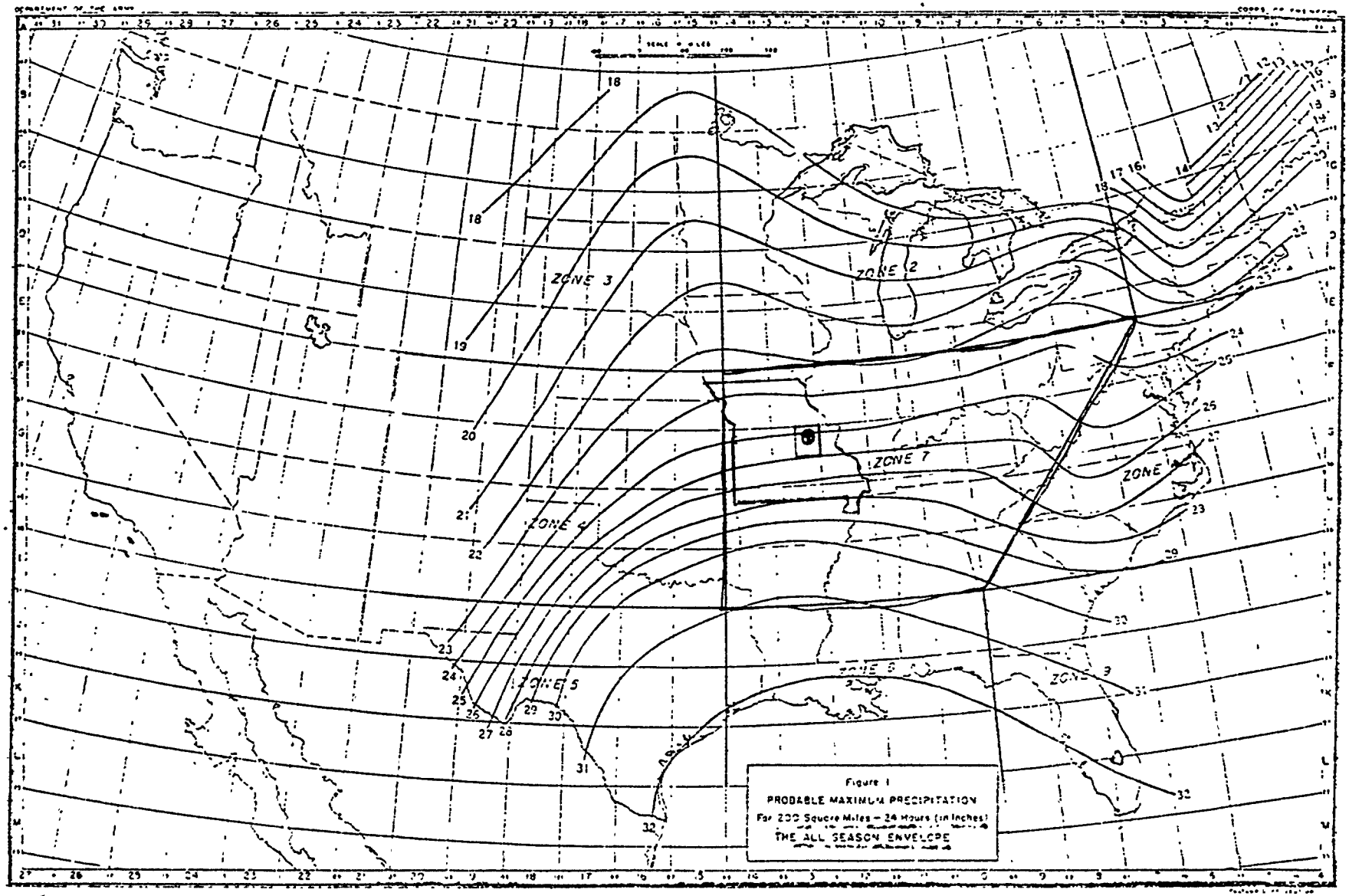
Long. = 91° 28' 30" Lat. = 38° 38' 37"

PMP = 25.1" (from Fig. 1, HMR 33)

Zone = 7

3) Determine basin rainfall in terms of percentage of PMP Index Rainfall for various durations. (from Fig. 2, HMR 33)

Duration (Hrs.)	Percent of Index Rainfall (%)	Total Rainfall (Inches)	Rainfall Increments (Inches)	Duration of Increment (Hrs.)
6	100	25.1"	25"	6
12	120	30.1"	5"	6
24	130	32.6"	2.5"	12



B-18

⊕ LOCATION OF BASIN CENTROID

A.C. SCHNEIDER LAKE DAM (MO 31563)

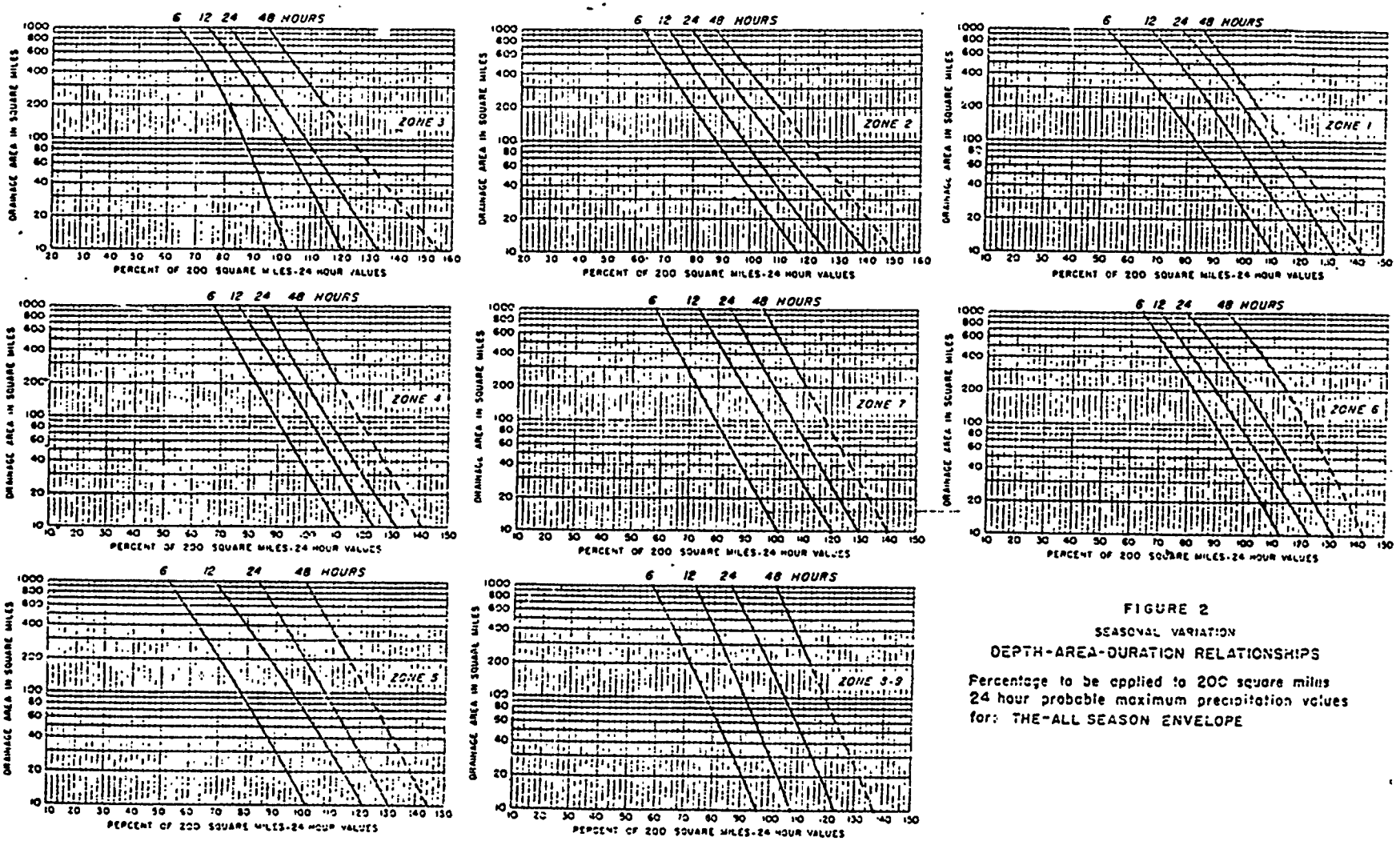


FIGURE 2

SEASONAL VARIATION

DEPTH-AREA-DURATION RELATIONSHIPS

Percentage to be applied to 200 square miles 24 hour probable maximum precipitation values for: THE-ALL SEASON ENVELOPE

PRC ENGINEERING CONSULTANTS, INC.

DAM SAFETY INSPECTION / MISSOURI - 1980 SHEET NO. 1 OF 1

DAM NAME: AC Schneider Lake Dam (4) (Mo 31563) JOB NO. 1263

CURVE NUMBER DETERMINATION BY DC DATE 6-16-80

I) SOIL GROUP

WATERSHED SOILS IN THE BASIN CONSIST OF GROUP A. B C D

Union - Goss - Gp Canada Ridge

GROUP B SOILS SEEM TO PREDOMINATE THE BASIN. THEREFORE, ASSUME GROUP B SOILS FOR THE ENTIRE WATERSHED FOR HYDROLOGIC PURPOSES.

II) COVER COMPLEX

ASSUMED LAND USE	ASSUMED HYDROLOGIC CONDITION	PER CENT AREA	CN (AMC II)
Forest	Fair	50%	60
Pasture & Range	Fair	50%	69

.5(60) + .5(69) = 64.5

III) CURVE NUMBER

WEIGHTED AVERAGE CN = 65 FOR AMC II

CURVE NUMBER = 82 FOR AMC III

ECI-4 **PRC ENGINEERING CONSULTANTS, INC.**

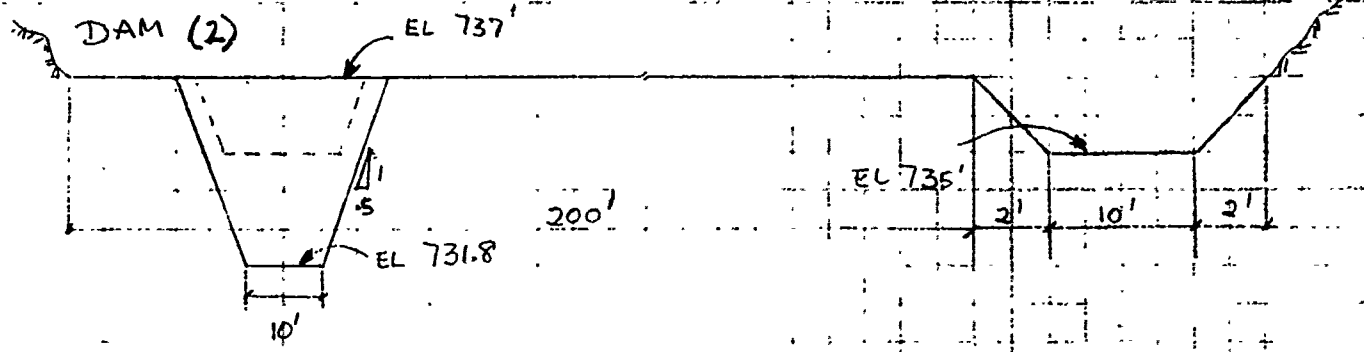
DAM SAFETY INSPECTION - MISSOURI — SHEET NO 1 OF 1

AC SCHNEIDER LAKE DAM - (MO 21563) — JOB NO. 1263

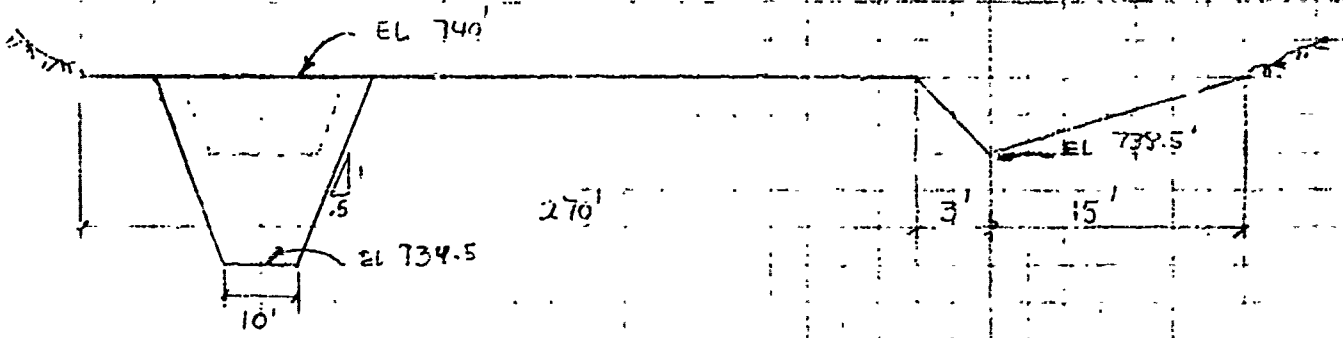
BREACH PARAMETERS — BY D.C DATE 6-19-80

For all dams, assume 1 hr for breach to develop, initial water level at spillway crest and water will breach dam when it reaches top of dam. Also 10 ft bottom width and .5 slope for all dams.

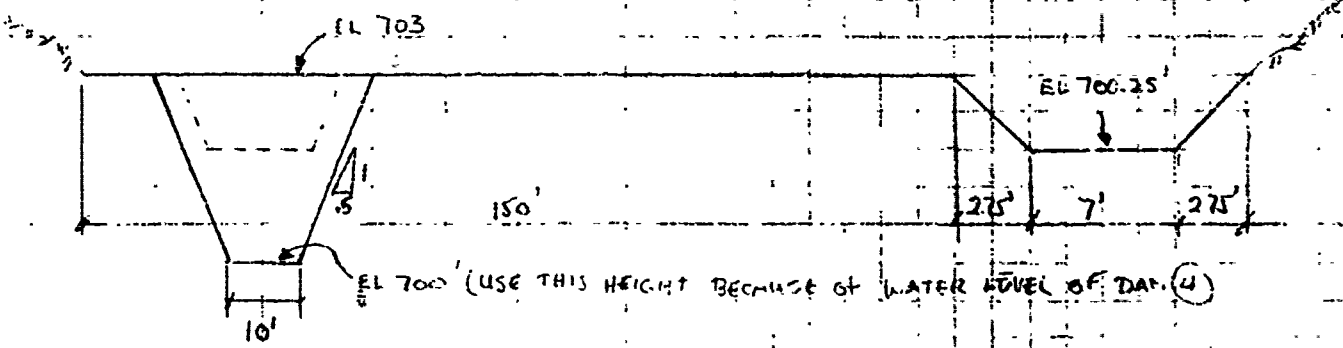
DAM (2)

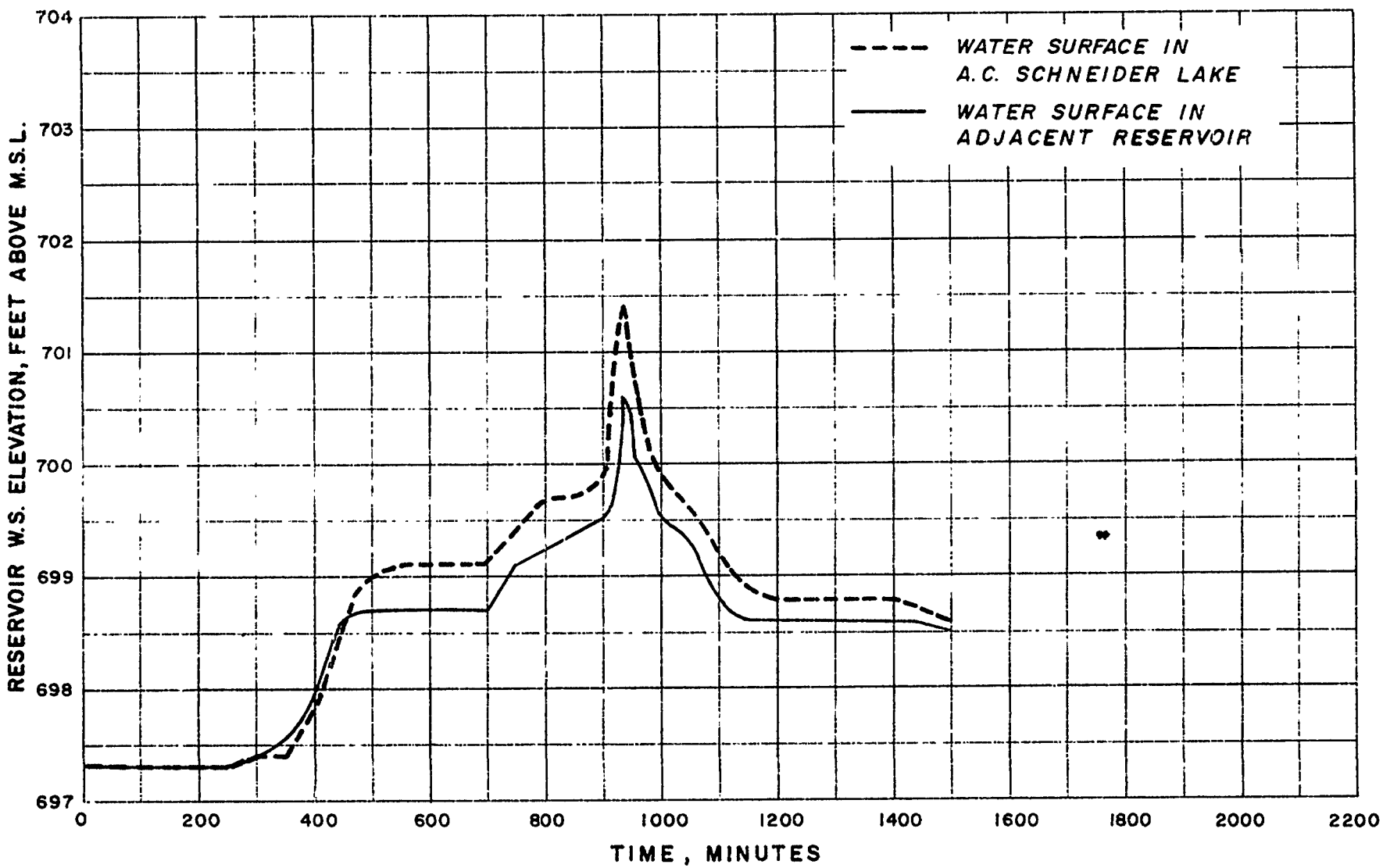


DAM (3)



DAM (1)





A.C. SCHNEIDER LAKE DAM AND ADJACENT DAM
RESERVOIR STAGE VS. TIME DURING PMF ROUTING

HEC1DB INPUT DATA

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********
    1                A1                    DAM SAFETY INSPECTION - MISSOURI
    2                A2                AC SCHNEIDER LAKE DAM ( MO 31563)
    3                A3                     PMF AND FIFTY PERCENT PMF
    4                B     300       0       5       0       0       0       0       0       0       0
    5                I1      5
    6                J       1       2       1
    7                J1      1      .5
    8                K       0  LAKE 2                                               1
    9                K1       RUNOFF CALCULATION FOR DRAINAGE AREA 2
   10                M       1       2    .022               .022       1
   11                T              25.1     100     120     130
   12                T                                                   -1     -78
   13                J3             .036
   14                K       0       0       1
   15                K       1  LAKE 2                                            1
   16                K1       ROUTE HYDROGRAPH THROUGH DAM 2
   17                Y                                       1       1
   18                Y1      1                                               -735     -1
   19                Y4    735     736.5   736.9   737.2   737.4   737.9   738.6   739.4
   20                Y5      0      60      90      143     284     606    1334    2291
   21                Z4      0      .3      .6      2
   22                ZE    727     735     737     740
   23                ZS    735
   24                ZD    737
   25                ZS     10      .5   731.8       1     735     737
```

```
26  K       0  LAKE 1                                                  1
27  K1       RUNOFF CALCULATION FOR DRAINAGE AREA 1
28  K       1        2    .089              .089         1
29  K            25.1      100       120      130
30  K                                                    -1       -78
31  K2           .173
32  K       0        2        1
33  K       2  LAKE 1                                                  1
34  K1       COMBINE HYDROGRAPHS FROM LAKE 2 AND 1
35  K       1  LAKE 1                                                  1
36  K1       ROUTE COMBINED HYDROGRAPH THROUGH DAM 1
37  K                                 1        1
38  K1      1                                                -700.25       -1
39  K4700.25    701.7    703.1    703.8    704.5    705.2      706
40  K5      0       43      137      451      957     1646     2465
41  K4      0        1        1      2.5        5      9.5       14       18       22
42  KE    693      701      703      710      720      730      740      750      760
43  K3700.25
44  KD    703
45  KB     10       .5      700        1  700.25      703
46  K       0  LAKE 4                                                  1
47  K1       RUNOFF CALCULATION FOR DRAINAGE AREA 4
48  K       1        2    .012              .012         1
49  K            25.1      100       120      130
50  K                                                    -1       -82
```

```
51                  X2          .0144
52                  X       0       0       1
53                  K       2  LAKE 4                                                   1
54                  K1       COMBINE HYDROGRAPHS FROM LAKE 1 AND RUNOFF 4
55                  K       1  LAKE 4                                                   1
56                  K1       ROUTE COMBINED HYDROGRAPHS THROUGH DAM 4
57                  Y                                   1       1
58                  Y1      1                                                  -697.3      -1
59                  Y4  697.3     698    698.5   698.58    698.6     699    699.9    700.6    700.9    701.3
60                  Y4  701.6   701.9    702.7
61                  Y5              2.3     3.4      4.7       23      34      297      765     1027     1554
62                  Y5  2141    2751     4611
                    SA              1       2      2.3       2.4       4        5        6
64                  SE   691     698   697.3   698.5       699     710      720      740
65                  SS  697.3
66                  SD   699
67                  K     99
```

INFLOW PMF AND ONE-HALF PMF HYDROGRAPHS

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	LAKE	2
ROUTE HYDROGRAPH TO	LAKE	2
RUNOFF HYDROGRAPH AT	LAKE	1
COMBINE [illegible] HYDROGRAPHS AT	LAKE	1
ROUTE HYDROGRAPH TO	LAKE	1
RUNOFF HYDROGRAPH AT	LAKE	4
COMBINE 2 HYDROGRAPHS AT	LAKE	4
ROUTE HYDROGRAPH TO	LAKE	4
END OF NETWORK		

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION  JULY 1978
  LAST MODIFICATION  28 FEB 79
**********

RUN DATE = 06/10/19..
TIME = 08.09.1..

                    DAM SAFETY INSPECTION - WINDSOR
                    MC JOHNSTON LAKE DAM (MD 21823)
                        PMF AND FIFTY PERCENT PMF

                        JOB SPECIFICATION
 NMIN   METRIC   IDAY   IHR   MIN   METRIC   IPLT   IPRT   NSTAN
                  0      0     0                0      3      0
                JOPER   NUR   LROPT   TRACE
                  1      0     0       3

                    MULTI-PLAN VALUES FOR PLAN 1
                    RATIO 1 RATIO 2 RATIO 3
                    RATIOS= 1.00

**********          **********          **********          **********          **********

                    SUB-AREA RUNOFF COMPUTATION

                    RUNOFF CALCULATION FOR THE ACE AREA

                ISTAT   ICOMP   IECON   ITAPE   JPLT   JPRT   INAME   ISTAGE   IAUTO
                  LAST    2       1       0      0      0      1       2        0

                        HYDROGRAPH DATA
                IUNG   TAREA   SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1      2     .02    0.00     .02    1.00    0.000      0       0

                        PRECIP DATA
                SPFE    PMS      R      R12     R24     R48     R72     R96
                0.00   22.50   100.00  120.00  130.00   0.00    0.00    0.00

                        LOSS DATA
                LOSS   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOS   STRTL   CNSTL   ALSMX   RTIMP
                  2     0.00    0.00    1.00     .00     0.00    1.00   -1.00  -78.00    0.00    0.00

                CURVE NO =  -78.00  MOISTURE =  -1.00  EFFECT CN =  78.00

                        UNIT HYDROGRAPH DATA
                        TC=  0.00    LAG=  .00

                        RECESSION DATA
                        STRTQ=    0.00    QRCSN=    0.00    RTIOR= 1.00

                TIME INCREMENT TOO LARGE--(DUR 1)  ( LAG/2)

                UNIT HYDROGRAPH 9 END OF PERIOD ORDINATES, TC=   0.00 HOURS, LAG=   .04  VOL= 1.00
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127. 55. 7. 1. 0.

O PO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	END-OF-PERIOD FLOW PO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	.01	.01	0.	1.01	12.35	181	.21	.19	.02	33.
1.01	.10	2	.01	.01	.01	0.	1.01	12.40	182	.21	.19	.02	33.
1.01	.15	3	.01	.00	.01	0.	1.01	12.45	183	.21	.19	.02	33.
1.01	.20	4	.01	.01	.01	0.	1.01	12.50	184	.21	.19	.02	33.
1.01	.25	5	.01	.01	.01	0.	1.01	12.55	185	.21	.19	.02	33.
1.01	.30	6	.01	.01	.01	0.	1.01	13.00	186	.21	.19	.01	33.
1.01	.35	7	.01	.01	.01	0.	1.01	13.05	187	.25	.23	.02	38.
1.01	.40	8	.01	.01	.01	0.	1.01	13.10	188	.25	.23	.02	40.
1.01	.45	9	.01	.01	.01	0.	1.01	13.15	189	.25	.24	.02	40.
1.01	.50	10	.01	.00	.01	0.	1.01	13.20	190	.25	.24	.01	40.
1.01	.55	11	.01	.01	.01	0.	1.01	13.25	191	.25	.24	.01	40.
1.01	1.00	12	.01	.01	.01	0.	1.01	13.30	192	.25	.24	.01	40.
1.01	1.05	13	.01	.01	.01	0.	1.01	13.35	193	.25	.24	.01	41.
1.01	1.10	14	.01	.01	.01	0.	1.01	13.40	194	.25	.24	.01	41.
1.01	1.15	15	.01	.00	.01	0.	1.01	13.45	195	.25	.24	.01	41.
1.01	1.20	16	.01	.01	.01	0.	1.01	13.50	196	.25	.24	.01	41.
1.01	1.25	17	.01	.01	.01	0.	1.01	13.55	197	.25	.24	.01	41.
1.01	1.30	18	.01	.01	.01	0.	1.01	14.00	198	.25	.24	.01	41.
1.01	1.35	19	.01	.01	.01	0.	1.01	14.05	199	.25	.24	.01	41.
1.01	1.40	20	.01	.01	.01	0.	1.01	14.10	200	.25	.24	.01	41.
1.01	1.45	21	.01	.01	.01	0.	1.01	14.15	201	.25	.24	.01	41.
1.01	1.50	22	.01	.01	.01	0.	1.01	14.20	202	.25	.24	.01	41.
1.01	1.55	23	.01	.01	.01	0.	1.01	14.25	203	.25	.24	.01	41.
1.01	2.00	24	.01	.01	.01	0.	1.01	14.30	204	.25	.24	.01	41.
1.01	2.05	25	.01	.01	.01	0.	1.01	14.35	205	.25	.24	.01	41.
1.01	2.10	26	.01	.01	.01	0.	1.01	14.40	206	.25	.24	.01	41.
1.01	2.15	27	.01	.01	.01	0.	1.01	14.45	207	.25	.24	.01	41.
1.01	2.20	28	.01	.01	.01	0.	1.01	14.50	208	.25	.24	.01	41.
1.01	2.25	29	.01	.01	.01	0.	1.01	14.55	209	.25	.24	.01	41.
1.01	2.30	30	.01	.01	.01	0.	1.01	15.00	210	.25	.24	.01	41.
1.01	2.35	31	.01	.01	.01	0.	1.01	15.05	211	.25	.24	.01	41.
1.01	2.40	32	.01	.01	.01	0.	1.01	15.10	212	.25	.24	.01	41.
1.01	2.45	33	.01	.01	.01	0.	1.01	15.15	213	.25	.24	.01	41.
1.01	2.50	34	.01	.01	.01	0.	1.01	15.20	214	.25	.24	.01	41.
1.01	2.55	35	.01	.01	.01	0.	1.01	15.25	215	.25	.24	.01	41.
1.01	3.00	36	.01	.01	.01	0.	1.01	15.30	216	.25	.24	.01	41.
1.01	3.05	37	.01	.01	.01	0.	1.01	15.35	217	.25	.24	.01	41.
1.01	3.10	38	.01	.01	.01	0.	1.01	15.40	218	.25	.24	.01	41.
1.01	3.15	39	.01	.01	.01	0.	1.01	15.45	219	.25	.24	.01	41.
1.01	3.20	40	.01	.01	.01	0.	1.01	15.50	220	.25	.24	.01	41.
1.01	3.25	41	.01	.01	.01	0.	1.01	15.55	221	.25	.24	.01	41.
1.01	3.30	42	.01	.01	.01	0.	1.01	16.00	222	.25	.24	.01	41.
1.01	3.35	43	.01	.01	.01	0.	1.01	16.05	223	.25	.24	.01	41.
1.01	3.40	44	.01	.01	.01	0.	1.01	16.10	224	.25	.24	.01	41.
1.01	3.45	45	.01	.01	.01	0.	1.01	16.15	225	.25	.24	.01	41.
1.01	3.50	46	.01	.01	.01	0.	1.01	16.20	226	.25	.24	.01	41.
1.01	3.55	47	.01	.01	.01	0.	1.01	16.25	227	.25	.24	.01	41.
1.01	4.00	48	.01	.01	.01	0.	1.01	16.30	228	.25	.24	.01	41.
1.01	4.05	49	.01	.01	.01	0.	1.01	16.35	229	.25	.24	.01	41.
1.01	4.10	50	.01	.01	.01	0.	1.01	16.40	230	.25	.24	.01	41.
1.01	4.15	51	.01	.01	.01	0.	1.01	16.45	231	.25	.24	.01	41.
1.01	4.20	52	.01	.01	.01	0.	1.01	16.50	232	.25	.24	.01	41.
1.01	4.25	53	.01	.01	.01	0.	1.01	16.55	233	.25	.24	.01	41.
1.01	4.30	54	.01	.01	.01	0.	1.01	17.00	234	.25	.24	.01	41.
1.01	4.35	55	.01	.00	.01	0.	1.01	17.05	235	.25	.25	.01	42.

1.01	4.40	56	.01	.00	.01	0.	1.01	17.10	206	.23	.23	.00	39.	
1.01	4.45	57	.01	.00	.01	0.	1.01	17.15	207	.23	.23	.00	39.	
1.01	4.50	58	.01	.00	.01	0.	1.01	17.20	208	.23	.23	.00	39.	
1.01	4.55	59	.01	.00	.01	0.	1.01	17.25	209	.23	.23	.00	39.	
1.01	5.00	60	.01	.00	.01	0.	1.01	17.30	210	.23	.23	.00	39.	
1.01	5.05	61	.01	.00	.01	0.	1.01	17.35	211	.23	.23	.00	39.	
1.01	5.10	62	.01	.00	.01	0.	1.01	17.40	212	.23	.23	.00	39.	
1.01	5.15	63	.01	.00	.01	0.	1.01	17.45	213	.23	.23	.00	39.	
1.01	5.20	64	.01	.00	.01	0.	1.01	17.50	214	.23	.23	.00	39.	
1.01	5.25	65	.01	.00	.01	0.	1.01	17.55	215	.23	.23	.00	39.	
1.01	5.30	66	.01	.00	.01	0.	1.01	18.00	216	.23	.23	.00	39.	
1.01	5.35	67	.01	.00	.01	1.	1.01	18.05	217	.02	.02	.00	13.	
1.01	5.40	68	.01	.00	.01	1.	1.01	18.10	218	.02	.02	.00	5.	
1.01	5.45	69	.01	.00	.01	1.	1.01	18.15	219	.02	.02	.00	4.	
1.01	5.50	70	.01	.00	.01	1.	1.01	18.20	220	.02	.02	.00	4.	
1.01	5.55	71	.01	.00	.01	1.	1.01	18.25	221	.02	.02	.00	4.	
1.01	6.00	72	.01	.00	.01	1.	1.01	18.30	222	.02	.02	.00	4.	
1.01	6.05	73	.07	.02	.05	3.	1.01	18.35	223	.02	.02	.00	4.	
1.01	6.10	74	.07	.02	.05	3.	1.01	18.40	224	.02	.02	.00	4.	
1.01	6.15	75	.07	.02	.05	3.	1.01	18.45	225	.02	.02	.00	4.	
1.01	6.20	76	.07	.02	.05	4.	1.01	18.50	226	.02	.02	.00	4.	
1.01	6.25	77	.07	.03	.04	4.	1.01	18.55	227	.02	.02	.00	4.	
1.01	6.30	78	.07	.03	.04	4.	1.01	19.00	228	.02	.02	.00	4.	
1.01	6.35	79	.07	.03	.04	4.	1.01	19.05	229	.02	.02	.00	4.	
1.01	6.40	80	.07	.03	.04	4.	1.01	19.10	230	.02	.02	.00	4.	
1.01	6.45	81	.07	.03	.04	4.	1.01	19.15	231	.02	.02	.00	4.	
1.01	6.50	82	.07	.03	.04	4.	1.01	19.20	232	.02	.02	.00	4.	
1.01	6.55	83	.07	.03	.04	4.	1.01	19.25	233	.02	.02	.00	4.	
1.01	7.00	84	.07	.04	.03	6.	1.01	19.30	234	.02	.02	.00	4.	
1.01	7.05	85	.07	.04	.03	6.	1.01	19.35	235	.02	.02	.00	4.	
1.01	7.10	86	.07	.04	.03	6.	1.01	19.40	236	.02	.02	.00	4.	
1.01	7.15	87	.07	.04	.03	7.	1.01	19.45	237	.02	.02	.00	4.	
1.01	7.20	88	.07	.04	.03	7.	1.01	19.50	238	.02	.02	.00	4.	
1.01	7.25	89	.07	.04	.03	7.	1.01	19.55	239	.02	.02	.00	4.	
1.01	7.30	90	.07	.04	.03	7.	1.01	20.00	240	.02	.02	.00	4.	
1.01	7.35	91	.07	.04	.03	7.	1.01	20.05	241	.02	.02	.00	4.	
1.01	7.40	92	.07	.04	.03	7.	1.01	20.10	242	.02	.02	.00	4.	
1.01	7.45	93	.07	.04	.03	8.	1.01	20.15	243	.02	.02	.00	4.	
1.01	7.50	94	.07	.05	.02	8.	1.01	20.20	244	.02	.02	.00	4.	
1.01	7.55	95	.07	.05	.02	8.	1.01	20.25	245	.02	.02	.00	4.	
1.01	8.00	96	.07	.05	.02	8.	1.01	20.30	246	.02	.02	.00	4.	
1.01	8.05	97	.07	.05	.02	8.	1.01	20.35	247	.02	.02	.00	4.	
1.01	8.10	98	.07	.05	.02	8.	1.01	20.40	248	.02	.02	.00	4.	
1.01	8.15	99	.07	.05	.02	8.	1.01	20.45	249	.02	.02	.00	4.	
1.01	8.20	100	.07	.05	.02	8.	1.01	20.50	250	.02	.02	.00	4.	
1.01	8.25	101	.07	.05	.02	8.	1.01	20.55	251	.02	.02	.00	4.	
1.01	8.30	102	.07	.05	.02	8.	1.01	21.00	252	.02	.02	.00	4.	
1.01	8.35	103	.07	.05	.02	8.	1.01	21.05	253	.02	.02	.00	4.	
1.01	8.40	104	.07	.05	.02	9.	1.01	21.10	254	.02	.02	.00	4.	
1.01	8.45	105	.07	.05	.02	9.	1.01	21.15	255	.02	.02	.00	4.	
1.01	8.50	106	.07	.05	.02	9.	1.01	21.20	256	.02	.02	.00	4.	
1.01	8.55	107	.07	.05	.02	9.	1.01	21.25	257	.02	.02	.00	4.	
1.01	9.00	108	.07	.05	.02	9.	1.01	21.30	258	.02	.02	.00	4.	
1.01	9.05	109	.07	.05	.02	9.	1.01	21.35	259	.02	.02	.00	4.	
1.01	9.10	110	.07	.05	.02	9.	1.01	21.40	260	.02	.02	.00	4.	
1.01	9.15	111	.07	.05	.02	9.	1.01	21.45	261	.02	.02	.00	4.	
1.01	9.20	112	.07	.05	.02	9.	1.01	21.50	262	.02	.02	.00	4.	
1.01	9.25	113	.07	.05	.01	9.	1.01	21.55	263	.02	.02	.00	4.	
1.01	9.30	114	.07	.06	.01	9.	1.01	22.00	264	.02	.02	.00	4.	
1.01	9.35	115	.07	.06	.01	9.	1.01	22.05	265	.02	.02	.00	4.	

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1.01	9.40	116	.07	.06	.01	0.	1.01	22.10	266	.02	.02	.00	4.
1.01	9.45	117	.07	.06	.01	10.	1.01	22.15	267	.02	.02	.00	4.
1.01	9.50	118	.07	.06	.01	10.	1.01	22.20	268	.02	.02	.00	4.
1.01	9.55	119	.07	.06	.01	10.	1.01	22.25	269	.02	.02	.00	4.
1.01	10.00	120	.07	.06	.01	10.	1.01	22.30	270	.02	.02	.00	4.
1.01	10.05	121	.07	.06	.01	10.	1.01	22.35	271	.02	.02	.00	4.
1.01	10.10	122	.07	.06	.01	10.	1.01	22.40	272	.02	.02	.00	4.
1.01	10.15	123	.07	.06	.01	10.	1.01	22.45	273	.02	.02	.00	4.
1.01	10.20	124	.07	.06	.01	10.	1.01	22.50	274	.02	.02	.00	4.
1.01	10.25	125	.07	.06	.01	10.	1.01	22.55	275	.02	.02	.00	4.
1.01	10.30	126	.07	.06	.01	10.	1.01	23.00	276	.02	.02	.00	4.
1.01	10.35	127	.07	.06	.01	10.	1.01	23.05	277	.02	.02	.00	4.
1.01	10.40	128	.07	.06	.01	10.	1.01	23.10	278	.02	.02	.00	4.
1.01	10.45	129	.07	.06	.01	10.	1.01	23.15	279	.02	.02	.00	4.
1.01	10.50	130	.07	.06	.01	10.	1.01	23.20	280	.02	.02	.00	4.
1.01	10.55	131	.07	.06	.01	10.	1.01	23.25	281	.02	.02	.00	4.
1.01	11.00	132	.07	.06	.01	10.	1.01	23.30	282	.02	.02	.00	4.
1.01	11.05	133	.07	.06	.01	10.	1.01	23.35	283	.02	.02	.00	4.
1.01	11.10	134	.07	.06	.01	10.	1.01	23.40	284	.02	.02	.00	4.
1.01	11.15	135	.07	.06	.01	10.	1.01	23.45	285	.02	.02	.00	4.
1.01	11.20	136	.07	.06	.01	10.	1.01	23.50	286	.02	.02	.00	4.
1.01	11.25	137	.07	.06	.01	10.	1.01	23.55	287	.02	.02	.00	4.
1.01	11.30	138	.07	.06	.01	10.	1.02	.00	288	.02	.02	.00	4.
1.01	11.35	139	.07	.06	.01	10.	1.02	.05	289	0.00	0.00	0.00	1.
1.01	11.40	140	.07	.06	.01	10.	1.02	.10	290	0.00	0.00	0.00	0.
1.01	11.45	141	.07	.06	.01	10.	1.02	.15	291	0.00	0.00	0.00	0.
1.01	11.50	142	.07	.06	.01	10.	1.02	.20	292	0.00	0.00	0.00	0.
1.01	11.55	143	.07	.06	.01	10.	1.02	.25	293	0.00	0.00	0.00	0.
1.01	12.00	144	.07	.06	.01	10.	1.02	.30	294	0.00	0.00	0.00	0.
1.01	12.05	145	.21	.18	.02	21.	1.02	.35	295	0.00	0.00	0.00	0.
1.01	12.10	146	.21	.19	.02	21.	1.02	.40	296	0.00	0.00	0.00	0.
1.01	12.15	147	.21	.19	.02	21.	1.02	.45	297	0.00	0.00	0.00	0.
1.01	12.20	148	.21	.19	.02	21.	1.02	.50	298	0.00	0.00	0.00	0.
1.01	12.25	149	.21	.19	.02	21.	1.02	.55	299	0.00	0.00	0.00	0.
1.01	12.30	150	.21	.19	.02	21.	1.02	1.00	300	0.00	0.00	0.00	0.

SUM 32.63 29.47 3.16 5945.
(829.)(749.)(80.)(142.86)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	394.	17.	17.	17.	5919.
CMS	11.	0.	0.	0.	142.
INCHES		24.29	25.47	29.47	29.47
MM		616.95	744.62	748.62	748.62
AC-FT		28.	35.	35.	35.
THOUS CU M		35.	43.	43.	43.

HYDROGRAPH AT STALAKE 2 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	3.	3.	4.	4.	4.	5.	5.	5.
5.	6.	6.	6.	6.	6.	7.	7.	7.	7.
7.	7.	8.	8.	8.	8.	8.	8.	8.	8.

8.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
11.	11.	10.	10.	26.	31.	32.	32.	32.	32.
33.	33.	33.	37.	33.	33.	38.	40.	40.	40.
40.	40.	41.	41.	41.	41.	41.	41.	49.	51.
51.	51.	52.	62.	62.	52.	52.	52.	52.	52.
77.	86.	92.	87.	108.	225.	394.	256.	141.	106.
74.	68.	65.	58.	48.	43.	45.	49.	49.	49.
49.	49.	43.	48.	42.	38.	38.	39.	39.	39.
39.	39.	39.	39.	39.	34.	15.	5.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	1.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	394.	87.	17.	17.	1019.
CMS	11.	2.	0.	0.	142.
INCHES		.34	.47	.47	.47
MM		8.5	11.62	11.62	11.62
AC-FT		28.	34.	35.	35.
THOUS CU M		3.	4.	4.	4.

HYDROGRAPH AT STALAKE 2 FOR FLAP 1. RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	2.	2.	2.	2.	2.	2.	3.
3.	3.	3.	3.	4.	3.	3.	3.	3.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	13.	15.	14.	16.	16.	16.
16.	16.	16.	19.	17.	17.	19.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	24.	25.
25.	24.	26.	24.	26.	26.	24.	26.	26.	26.
18.	28.	31.	43.	53.	114.	197.	118.	79.	53.
37.	33.	27.	25.	25.	25.	25.	25.	25.	25.
25.	25.	23.	25.	21.	20.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	6.	3.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

2.	2.	2.	2.	2.	2.	2.	2.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	197.	29.	9.	8.	2509.
CMS	6.	1.	0.	0.	71.
INCHES		12.14	14.74	14.74	14.74
CM		308.42	374.31	374.31	374.31
AC-FT		14.	17.	17.	17.
THOUS CU M		18.	21.	21.	21.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THROUGH DAM 2

ISTAT	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
(PRL 2	1	1	3	0	2	1	3	0

ROUTING DATA

CLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	3.000	2.00	1	1	2	0		0

NSTPS	NSTPL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	2	0	0.000	0.000	1.000	-735.	-1

STAGE	735.00	736.50	736.90	737.20	737.40	737.90	738.60	739.90
FLOW	0.00	60.00	99.00	143.00	284.00	606.00	1314.00	2291.00
SURFACE AREA=	0.	0.	1.	2.				
CAPACITY=	0.	1.	2.	5.				
ELEVATION=	727.	734.	737.	740.				

CREL	SPRAT	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
735.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
737.0	0.0	0.0	0.

DAM BREACH DATA

BRWID	Z	ELBR	TFAIL	MSEL	FAILEL
10.	.50	731.00	1.00	735.00	737.00

STATION LAKE 2, PLAN 1, RATIO 1

BEGIN DAM FAILURE AT 15.50 HOURS

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

[illegible]	735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0
735.0	735.0	[illegible]	[illegible]	735.0	735.0	735.0	735.0	735.0	735.0
735.0	735.0	735.0	[illegible]	735.0	735.0	735.0	735.0	735.0	735.0
735.0	[illegible]	[illegible]	735.0	735.0	735.0	735.0	735.0	735.0	735.0
735.0	735.0	[illegible]	735.0	735.0	735.0	735.0	735.0	735.0	735.0
735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0
735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0	735.0
735.0	[illegible]	735.0	735.1	735.1	735.1	735.1	735.1	735.1	735.1
735.1	735.1	735.1	735.1	735.2	735.2	735.2	735.2	735.2	735.2
735.2	[illegible]	735.2	735.2	735.2	735.2	735.2	735.2	735.2	735.2
[illegible]	735.2	[illegible]	735.2	735.2	735.2	735.2	735.2	735.2	735.2
735.2	735.2	735.2	735.2	735.2	735.2	735.2	736.2	735.2	735.2
735.2	735.2	735.2	735.2	735.2	735.2	735.2	735.2	735.2	735.3
735.2	735.3	735.3	735.3	[illegible]	735.2	735.3	735.3	735.3	735.3
[illegible]	[illegible]	[illegible]	735.3	735.4	[illegible]	735.7	735.7	[illegible]	735.8
735.8	[illegible]	[illegible]	735.3	735.8	735.6	735.7	[illegible]	736.0	736.0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	736.0	736.0	736.0	736.1	736.1
[illegible]	736.2	[illegible]	[illegible]	736.3	[illegible]	[illegible]	[illegible]	736.3	736.3
[illegible]	736.2	[illegible]	736.5	736.8	[illegible]	737.5	[illegible]	737.1	736.7
736.3	[illegible]	[illegible]	[illegible]	734.7	734.3	[illegible]	[illegible]	733.1	733.1
733.1	733.1	733.1	[illegible]	733.1	[illegible]	[illegible]	732.9	732.7	732.9
[illegible]	[illegible]	732.9	[illegible]	[illegible]	[illegible]	732.7	[illegible]	732.1	732.1
732.0	732.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	732.0	732.0
732.0	[illegible]	732.0	[illegible]	[illegible]	732.0	732.0	[illegible]	732.0	732.0
732.0	[illegible]	732.0	732.0	733.0	732.0	732.0	[illegible]	732.0	732.0
732.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	732.0	732.0
732.0	[illegible]	[illegible]	[illegible]	732.0	732.0	732.0	732.0	732.0	732.0
[illegible]	[illegible]	732.0	[illegible]	732.0	[illegible]	[illegible]	[illegible]	732.0	732.0
732.0	[illegible]	732.0	732.0	732.0	732.0	731.0	[illegible]	732.0	731.9
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	731.8	731.8

PEAK OUTFLOW IS [illegible]. AT TIME 15.60 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	371.	59.	18.	17.	5095.
CMS	11.	2.	1.	0.	144.
INCHES		24.74	29.92	29.92	29.92
MM		628.47	759.97	759.97	759.97
AC-FT		29.	35.	35.	35.
THOUS CU M		36.	43.	43.	43.

B-87

THE DAM BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF .021 HOURS DURING BREACH FORMATION.
DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .083 HOURS.
THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH.
INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	-	COMPUTED BREACH HYDROGRAPH (CFS)	=	ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (AC-FT)
15.500	0.000	176.		176.		0.	0.	0.
15.521	.021	224.		247.		-23.	-23.	-0.
15.542	.042	273.		290.		-17.	-40.	-0.
15.563	.063	322.		330.		-8.	-48.	-0.
15.583	.083	371.		371.		0.	-48.	-0.
15.604	.104	343.		377.		-34.	-81.	-0.
15.625	.125	314.		343.		-27.	-108.	-0.
15.646	.146	283.		303.		-19.	-127.	-0.
15.667	.167	261.		261.		0.	-127.	-0.
15.688	.188	240.		251.		11.	-111.	-0.
15.708	.208	219.		204.		15.	-96.	-0.
15.729	.229	147.		156.		9.	-88.	-0.
15.750	.250	176.		176.		0.	-88.	-0.
15.771	.271	156.		161.		5.	-82.	-0.
15.792	.292	147.		147.		5.	-76.	-0.
15.813	.313	147.		143.		4.	-71.	-0.
15.833	.333	137.		137.		0.	-71.	-0.
15.854	.354	137.		132.		5.	-73.	-0.
15.875	.375	127.		128.		1.	-68.	-0.
15.896	.396	117.		118.		1.	-68.	-0.
15.917	.417	110.		110.		0.	-69.	-0.
15.938	.438	105.		104.		1.	-67.	-0.
15.958	.458	100.		99.		1.	-66.	-0.
15.979	.479	96.		95.		1.	-65.	-0.
16.000	.500	91.		91.		0.	-65.	-0.
16.021	.521	87.		87.		-0.	-65.	-0.
16.042	.542	83.		83.		-0.	-65.	-0.
16.063	.563	79.		79.		-0.	-65.	-0.
16.083	.583	75.		75.		0.	-65.	-0.
16.104	.604	73.		72.		1.	-64.	-0.
16.125	.625	70.		69.		1.	-63.	-0.
16.146	.646	67.		67.		1.	-62.	-0.
16.167	.667	65.		65.		0.	-62.	-0.
16.188	.688	65.		64.		1.	-61.	-0.
16.208	.708	65.		65.		0.	-60.	-0.
16.229	.729	66.		66.		-0.	-60.	-0.
16.250	.750	67.		67.		1.	-60.	-0.
16.271	.771	66.		67.		-0.	-61.	-0.
16.292	.792	66.		66.		-0.	-61.	-0.
16.313	.813	66.		66.		-0.	-61.	-0.
16.333	.833	66.		66.		0.	-61.	-0.
16.354	.854	65.		65.		-0.	-61.	-0.
16.375	.875	65.		65.		-0.	-61.	-0.
16.396	.896	64.		64.		-0.	-61.	-0.
16.417	.917	64.		64.		0.	-61.	-0.
16.438	.937	63.		64.		0.	-61.	-0.
16.458	.958	63.		63.		0.	-61.	-0.
16.479	.979	63.		63.		0.	-61.	-0.
16.500	1.000	62.		62.		0.	-61.	-0.

QVH

STATION LAKE 2, PLAN 1, RATIO 2

BEGIN DAM FAILURE AT 15.53 HOURS

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	[illegible]	0.	[illegible]	0.	[illegible]	0.	0.	0.
[illegible]	[illegible]	1.	1.	[illegible]	2.	2.	2.	2.	2.
3.	3.	[illegible]	3.	[illegible]	3.	[illegible]	3.	3.	3.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	5.
5.	5.	5.	5.	5.	5.	[illegible]	5.	5.	5.
5.	[illegible]	5.	5.	[illegible]	5.	5.	5.	5.	5.
5.	5.	5.	5.	[illegible]	5.	5.	5.	[illegible]	5.
5.	5.	5.	5.	[illegible]	11.	14.	15.	16.	16.
15.	15.	16.	16.	16.	16.	17.	18.	19.	20.
20.	20.	20.	20.	20.	20.	20.	20.	21.	23.
24.	25.	25.	26.	26.	26.	26.	26.	26.	26.
24.	24.	27.	[illegible]	42.	60.	[illegible]	145.	103.	79.
65.	57.	42.	38.	41.	41.	39.	59.	35.	26.
25.	25.	23.	24.	24.	20.	20.	19.	17.	19.
17.	19.	19.	19.	19.	17.	15.	8.	3.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	1.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

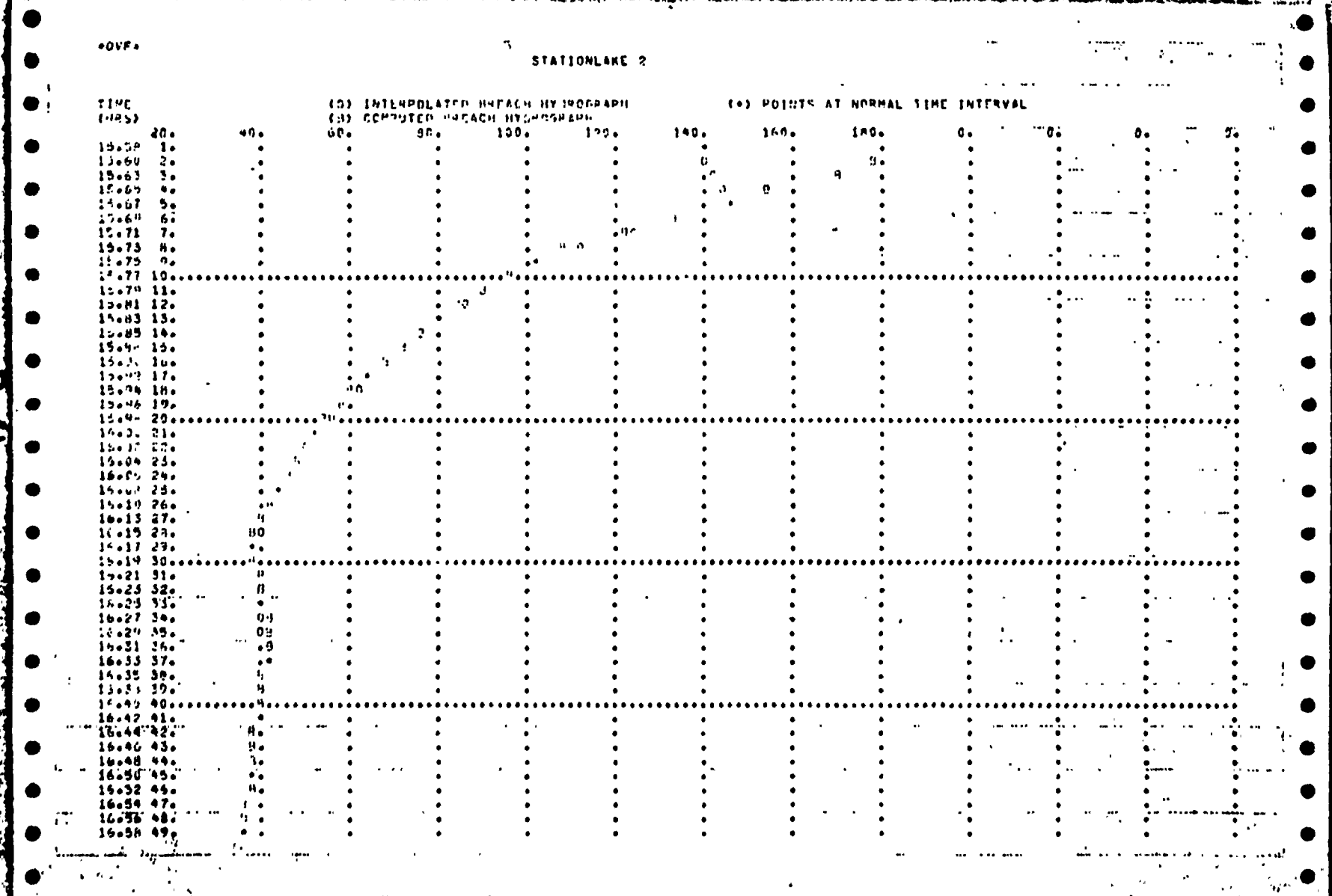
STORAGE

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	[illegible]	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	[illegible]	2.	2.	1.

```
        1.        1.        1.        1.        1.        1.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        0.        0.        0.        0.

                                                  STAGE
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.0
    735.0     735.0     735.0     735.0     735.0     735.0     735.0     735.1     735.1     735.1
    735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1
    735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1
    735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1
    735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1
    735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1
    735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1     735.1
    735.1     735.1     735.1     735.1     735.1 [illegible] [illegible] 735.4 [illegible] 735.4
    735.4     735.4     735.4     735.4     735.4     735.4     735.4     735.5     735.5     735.5
    735.5     735.5     735.5     735.5     735.5     735.5     735.5     735.5     735.5     735.6
    735.6     735.6     735.6     735.6     735.6     735.6     735.6     735.6     735.6     735.6
    735.6     735.6     735.7     735.8     736.2     736.5     737.2     737.1     736.6     736.5
    736.1     735.7     735.3     735.0     734.7     734.1     733.6     733.1     732.9     732.7
    732.3     732.4     732.5     732.6     732.6     732.6     732.6     732.6     732.6     732.5
    732.9     732.5     732.3     732.3     732.3     732.2     732.4     732.1     732.0     732.0
    732.1     732.0     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9
    731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9
    731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9
    731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9
    731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9
    731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9
    731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9     731.9
    731.8     731.8     731.8     731.8     731.8     731.8     731.8     731.8     731.8     731.8

PEAK OUTFLOW IS      178. AT TIME  15.60 HOURS

                             PEAK    6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
                 CFS         145.       30.         9.         9.           2587.
                 CMS           4.        1.         0.         0.             73.
              INCHES                 12.59      15.19      15.19           15.19
                  MM                319.85     385.92     385.92          385.92
               AC-FT                   15.        18.        18.             18.
          THOUS CU M                   18.        22.        22.             22.
```

THE DAM BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF .021 HOURS DURING BREACH FORMATION.
DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .083 HOURS.
THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH.
INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	=	COMPUTED BREACH HYDROGRAPH (CFS)	=	ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (AC-FT)
15.583	0.000	193.		193.		0.	0.	0.
15.604	.021	191.		178.		-13.	-13.	-0.
15.625	.042	182.		170.		-12.	-25.	-0.
15.646	.063	168.		154.		-13.	-38.	-0.
15.667	.083	145.		145.		0.	-38.	-0.
15.688	.104	141.		134.		1.	-37.	-0.
15.708	.125	129.		126.		3.	-34.	-0.
15.729	.146	119.		115.		4.	-30.	-0.
15.750	.167	112.		109.		3.	-27.	-0.
15.771	.188	96.		96.		1.	-26.	-0.
15.792	.208	91.		90.		1.	-24.	-0.
15.813	.229	85.		84.		1.	-23.	-0.
15.833	.250	79.		79.		0.	-23.	-0.
15.854	.271	78.		76.		-1.	-24.	-0.
15.879	.292	72.		73.		-1.	-24.	-0.
15.896	.313	69.		68.		-1.	-25.	-0.
15.917	.333	65.		65.		0.	-25.	-0.
15.938	.354	63.		61.		1.	-24.	-0.
15.958	.375	58.		57.		1.	-23.	-0.
15.979	.396	55.		54.		1.	-22.	-0.
16.000	.417	53.		53.		0.	-22.	-0.
16.021	.438	50.		50.		0.	-22.	-0.
16.042	.458	49.		49.		0.	-22.	-0.
16.063	.479	46.		46.		0.	-22.	-0.
16.083	.500	45.		45.		0.	-22.	-0.
16.104	.521	43.		43.		0.	-22.	-0.
16.125	.542	41.		41.		1.	-21.	-0.
16.146	.563	39.		39.		0.	-21.	-0.
16.167	.583	39.		38.		0.	-21.	-0.
16.188	.604	38.		38.		1.	-20.	-0.
16.208	.625	38.		38.		0.	-20.	-0.
16.229	.646	41.		42.		-0.	-20.	-0.
16.250	.667	41.		41.		0.	-20.	-0.
16.271	.688	41.		41.		-0.	-20.	-0.
16.292	.708	41.		41.		-0.	-21.	-0.
16.313	.729	41.		41.		-0.	-21.	-0.
16.333	.750	41.		41.		0.	-21.	-0.
16.354	.771	41.		41.		-0.	-21.	-0.
16.375	.792	40.		40.		-0.	-21.	-0.
16.396	.812	40.		40.		-0.	-21.	-0.
16.417	.833	39.		39.		0.	-21.	-0.
16.438	.854	39.		39.		-0.	-21.	-0.
16.458	.875	39.		39.		-0.	-21.	-0.
16.479	.896	38.		38.		-0.	-21.	-0.
16.500	.917	38.		38.		0.	-21.	-0.
16.521	.937	37.		37.		0.	-21.	-0.
16.542	.958	37.		37.		0.	-21.	-0.
16.563	.979	36.		36.		0.	-21.	-0.
16.583	1.000	36.		36.		0.	-21.	-0.


OVF
STATIONLAKE 2
TIME (HRS)
(I) INTERPOLATED INFLOW HYDROGRAPH
(O) COMPUTED INFLOW HYDROGRAPH
(*) POINTS AT NORMAL TIME INTERVAL
20. 40. 60. 80. 100. 120. 140. 160. 180. 0. 0. 0. 2.
15.58 1.
15.60 2.
15.63 3.
15.65 4.
15.67 5.
15.69 6.
15.71 7.
15.73 8.
15.75 9.
15.77 10.
15.79 11.
15.81 12.
15.83 13.
15.85 14.
15.87 15.
15.90 16.
15.92 17.
15.94 18.
15.96 19.
15.98 20.
16.01 21.
16.03 22.
16.04 23.
16.06 24.
16.08 25.
16.10 26.
16.13 27.
16.15 28.
16.17 29.
16.19 30.
16.21 31.
16.23 32.
16.25 33.
16.27 34.
16.29 35.
16.31 36.
16.33 37.
16.35 38.
16.37 39.
16.40 40.
16.42 41.
16.44 42.
16.46 43.
16.48 44.
16.50 45.
16.52 46.
16.54 47.
16.56 48.
16.58 49.

DVN

SUB-AREA RUNOFF COMPUTATION

RUNOFF CALCULATION FOR DRAINAGE AREA 1

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.07	0.00	.07	1.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	29.10	160.00	170.00	170.00	0.00	0.00	0.00

LOSS DATA

LKOPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOR	STRTL	CNSTL	ALSMX	RTIMP
	0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-70.00	0.00	0.00

CURVE NO = -70.00 MOISTURE = -1.00 EFFECT CN = 70.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= .07

RECESSION DATA

STRTQ= 0.0 QRCSN= 0.00 RTIOR= 1.00

TIME INCREMENT TOO LARGE--(MUST BE AT LEAST LAG/2)

UNIT HYDROGRAPH 4 END-OF-PERIOD ORDINATES, TC= 0.00 HOURS, LAG= .07 VOL= 1.00

311. 266. 74. 24. 7. 2.

END-OF-PERIOD FLOW

HR.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	HR.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	0.00	.01	0.	1.01	11.55	151	.21	.19	.02	131.
1.01	.10	2	.01	0.00	.01	0.	1.01	12.00	152	.21	.19	.02	132.
1.01	.15	3	.01	0.00	.01	0.	1.01	12.05	153	.21	.19	.02	132.
1.01	.20	4	.01	0.00	.01	0.	1.01	12.10	154	.21	.19	.02	133.
1.01	.25	5	.01	0.00	.01	0.	1.01	12.15	155	.21	.19	.02	133.
1.01	.30	6	.01	0.00	.01	0.	1.01	12.20	156	.21	.19	.01	134.
1.01	.35	7	.01	0.00	.01	0.	1.01	12.25	157	.22	.21	.02	146.
1.01	.40	8	.01	0.00	.01	0.	1.01	12.30	158	.23	.21	.02	147.
1.01	.45	9	.01	0.00	.01	0.	1.01	12.35	159	.23	.21	.02	148.
1.01	.50	10	.01	0.00	.01	0.	1.01	12.40	160	.23	.21	.01	148.
1.01	.55	11	.01	0.00	.01	0.	1.01	12.45	161	.23	.21	.01	149.
1.01	1.00	12	.01	0.00	.01	0.	1.01	12.50	162	.23	.21	.01	150.
1.01	1.05	13	.01	0.00	.01	0.	1.01	12.55	163	.23	.21	.01	151.
1.01	1.10	14	.01	0.00	.01	0.	1.01	13.00	164	.23	.21	.01	151.
1.01	1.15	15	.01	0.00	.01	0.	1.01	13.05	165	.23	.21	.01	152.
1.01	1.20	16	.01	0.00	.01	0.	1.01	13.10	166	.23	.21	.01	153.
1.01	1.25	17	.01	0.00	.01	0.	1.01	13.15	167	.23	.21	.01	153.
1.01	1.30	18	.01	0.00	.01	0.	1.01	13.20	168	.23	.21	.01	154.
1.01	1.35	19	.01	0.00	.01	0.	1.01	13.25	169	.23	.21	.01	155.

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1.01	1.40	20	.01	0.00	.01	0.
1.01	1.45	21	.01	0.00	.01	0.
1.01	1.50	22	.01	0.00	.01	0.
1.01	1.55	23	.01	0.00	.01	0.
1.01	2.00	24	.01	0.00	.01	0.
1.01	2	25	.01	0.00	.01	0.
1.01	2.10	26	.01	0.00	.01	0.
1.01	2.15	27	.01	0.00	.01	0.
1.01	2.20	28	.01	0.00	.01	0.
1.01	2.25	29	.01	0.00	.01	0.
1.01	2.30	30	.01	0.00	.01	0.
1.01	2.35	31	.01	0.00	.01	0.
1.01	2.40	32	.01	0.00	.01	0.
1.01	2.45	33	.01	0.00	.01	0.
1.01	2.50	34	.01	0.00	.01	0.
1.01	2.55	35	.01	0.00	.01	0.
1.01	3.00	36	.01	0.00	.01	0.
1.01	3.05	37	.01	0.00	.01	0.
1.01	3.10	38	.01	0.00	.01	0.
1.01	3.15	39	.01	0.00	.01	0.
1.01	3.20	40	.01	0.00	.01	0.
1.01	3.25	41	.01	.00	.01	0.
1.01	3.30	42	.01	.00	.01	0.
1.01	3.35	43	.01	.00	.01	0.
1.01	3.40	44	.01	.00	.01	0.
1.01	3.45	45	.01	.00	.01	0.
1.01	3.50	46	.01	.00	.01	0.
1.01	3.55	47	.01	.00	.01	0.
1.01	4.00	48	.01	.00	.01	0.
1.01	4.05	49	.01	.00	.01	0.
1.01	4.10	50	.01	.00	.01	0.
1.01	4.15	51	.01	.00	.01	0.
1.01	4.20	52	.01	.00	.01	0.
1.01	4.25	53	.01	.00	.01	0.
1.01	4.30	54	.01	.00	.01	0.
1.01	4.35	55	.01	.00	.01	0.
1.01	4.40	56	.01	.00	.01	0.
1.01	4.45	57	.01	.00	.01	0.
1.01	4.50	58	.01	.00	.01	0.
1.01	4.55	59	.01	.00	.01	0.
1.01	5.00	60	.01	.00	.01	0.
1.01	5.05	61	.01	.00	.01	0.
1.01	5.10	62	.01	.00	.01	0.
1.01	5.15	63	.01	.00	.01	0.
1.01	5.20	64	.01	.00	.01	0.
1.01	5.25	65	.01	.00	.01	0.
1.01	5.30	66	.01	.00	.01	0.
1.01	5.35	67	.01	.00	.01	0.
1.01	5.40	68	.01	.00	.01	0.
1.01	5.45	69	.01	.00	.01	0.
1.01	5.50	70	.01	.00	.01	0.
1.01	5.55	71	.01	.00	.01	0.
1.01	6.00	72	.01	.00	.01	0.
1.01	6.05	73	.07	.02	.05	7.
1.01	6.10	74	.07	.02	.05	12.
1.01	6.15	75	.07	.02	.05	14.
1.01	6.20	76	.07	.02	.05	16.
1.01	6.25	77	.07	.03	.04	17.
1.01	6.30	78	.07	.03	.04	18.
1.01	6.35	79	.07	.03	.04	19.

1.01	14.10	170	.31	.30	.01	201.
1.01	14.15	171	.31	.30	.01	206.
1.01	14.20	172	.31	.30	.01	208.
1.01	14.25	173	.31	.30	.01	208.
1.01	14.30	174	.31	.30	.01	209.
1.01	14.35	175	.31	.30	.01	209.
1.01	14.40	176	.31	.30	.01	209.
1.01	14.45	177	.31	.30	.01	210.
1.01	14.50	178	.31	.30	.01	210.
1.01	14.55	179	.31	.31	.01	210.
1.01	15.00	180	.31	.31	.01	210.
1.01	15.05	181	.19	.19	.00	173.
1.01	15.10	182	.38	.37	.01	199.
1.01	15.15	183	.38	.37	.01	240.
1.01	15.20	184	.57	.56	.01	310.
1.01	15.25	185	.67	.65	.01	392.
1.01	15.30	186	1.62	1.59	.03	724.
1.01	15.35	187	2.67	2.63	.04	1309.
1.01	15.40	188	1.05	1.04	.01	1166.
1.01	15.45	189	.67	.66	.01	731.
1.01	15.50	190	.57	.57	.01	508.
1.01	15.55	191	.38	.38	.00	367.
1.01	16.00	192	.38	.38	.00	292.
1.01	16.05	193	.29	.29	.00	241.
1.01	16.10	194	.29	.29	.00	211.
1.01	16.15	195	.29	.29	.00	203.
1.01	16.20	196	.29	.29	.00	201.
1.01	16.25	7	.29	.29	.00	200.
1.01	16.30		.29	.29	.00	200.
1.01	16.35		.29	.29	.00	200.
1.01	16.40		.29	.29	.00	200.
1.01	16.45	201	.29	.29	.00	200.
1.01	16.50	202	.29	.29	.00	200.
1.01	16.55	203	.29	.29	.00	200.
1.01	17.00	204	.29	.29	.00	200.
1.01	17.05	205	.23	.23	.00	181.
1.01	17.10	206	.23	.23	.00	164.
1.01	17.15	207	.23	.23	.00	159.
1.01	17.20	208	.23	.23	.00	158.
1.01	17.25	209	.23	.23	.00	157.
1.01	17.30	210	.23	.23	.00	157.
1.01	17.35	211	.23	.23	.00	157.
1.01	17.40	212	.23	.23	.00	157.
1.01	17.45	213	.23	.23	.00	157.
1.01	17.50	214	.23	.23	.00	157.
1.01	17.55	215	.23	.23	.00	157.
1.01	18.00	216	.23	.23	.00	157.
1.01	18.05	217	.02	.02	.00	93.
1.01	18.10	218	.02	.02	.00	38.
1.01	18.15	219	.02	.02	.00	21.
1.01	18.20	220	.02	.02	.00	16.
1.01	18.25	221	.02	.02	.00	15.
1.01	18.30	222	.02	.02	.00	14.
1.01	18.35	223	.02	.02	.00	14.
1.01	18.40	224	.02	.02	.00	14.
1.01	18.45	225	.02	.02	.00	14.
1.01	18.50	226	.02	.02	.00	14.
1.01	18.55	227	.02	.02	.00	14.
1.01	19.00	228	.02	.02	.00	14.
1.01	19.05	229	.02	.02	.00	14.

1.01	6.40	90	.07	.03	.04	21.	1.01	19.10	230	.02	.02	.00	14.	
1.01	6.45	91	.07	.03	.04	22.	1.01	19.15	231	.02	.02	.00	14.	
1.01	6.50	92	.07	.03	.04	22.	1.01	19.20	232	.02	.02	.00	14.	
1.01	6.55	93	.07	.03	.03	23.	1.01	19.25	233	.02	.02	.00	14.	
1.01	7.00	94	.07	.04	.03	24.	1.01	19.30	234	.02	.02	.00	14.	
1.01	7.05	95	.07	.04	.03	25.	1.01	19.35	235	.02	.02	.00	14.	
1.01	7.10	96	.07	.04	.03	26.	1.01	19.40	236	.02	.02	.00	14.	
1.01	7.15	97	.07	.04	.03	27.	1.01	19.45	237	.02	.02	.00	14.	
1.01	7.20	98	.07	.04	.03	27.	1.01	19.50	238	.02	.02	.00	14.	
1.01	7.25	99	.07	.04	.03	28.	1.01	19.55	239	.02	.02	.00	14.	
1.01	7.30	96	.07	.04	.03	29.	1.01	20.00	240	.02	.02	.00	14.	
1.01	7.35	91	.07	.04	.03	29.	1.01	20.05	241	.02	.02	.00	14.	
1.01	7.40	92	.07	.04	.03	30.	1.01	20.10	242	.02	.02	.00	14.	
1.01	7.45	93	.07	.04	.03	30.	1.01	20.15	243	.02	.02	.00	14.	
1.01	7.50	94	.07	.05	.02	31.	1.01	20.20	244	.02	.02	.00	14.	
1.01	7.55	95	.07	.05	.02	31.	1.01	20.25	245	.02	.02	.00	14.	
1.01	8.00	96	.07	.05	.02	32.	1.01	20.30	246	.02	.02	.00	14.	
1.01	8.05	97	.07	.05	.02	32.	1.01	20.35	247	.02	.02	.00	14.	
1.01	8.10	98	.07	.05	.02	33.	1.01	20.40	248	.02	.02	.00	14.	
1.01	8.15	99	.07	.05	.02	33.	1.01	20.45	249	.02	.02	.00	14.	
1.01	8.20	100	.07	.05	.02	33.	1.01	20.50	250	.02	.02	.00	14.	
1.01	8.25	101	.07	.05	.02	34.	1.01	20.55	251	.02	.02	.00	14.	
1.01	8.30	102	.07	.05	.02	34.	1.01	21.00	252	.02	.02	.00	14.	
1.01	8.35	103	.07	.05	.02	35.	1.01	21.05	253	.02	.02	.00	14.	
1.01	8.40	104	.07	.05	.02	35.	1.01	21.10	254	.02	.02	.00	14.	
1.01	8.45	105	.07	.05	.02	35.	1.01	21.15	255	.02	.02	.00	14.	
1.01	8.50	106	.07	.05	.02	36.	1.01	21.20	256	.02	.02	.00	14.	
1.01	8.55	107	.07	.05	.02	36.	1.01	21.25	257	.02	.02	.00	14.	
1.01	9.00	108	.07	.05	.02	36.	1.01	21.30	258	.02	.02	.00	14.	
1.01	9.05	109	.07	.05	.02	36.	1.01	21.35	259	.02	.02	.00	14.	
1.01	9.10	110	.07	.05	.02	37.	1.01	21.40	260	.02	.02	.00	14.	
1.01	9.15	111	.07	.05	.02	37.	1.01	21.45	261	.02	.02	.00	14.	
1.01	9.20	112	.07	.05	.02	37.	1.01	21.50	262	.02	.02	.00	14.	
1.01	9.25	113	.07	.06	.01	38.	1.01	21.55	263	.02	.02	.00	14.	
1.01	9.30	114	.07	.06	.01	38.	1.01	22.00	264	.02	.02	.00	14.	
1.01	9.35	115	.07	.06	.01	38.	1.01	22.05	265	.02	.02	.00	14.	
1.01	9.40	116	.07	.06	.01	38.	1.01	22.10	266	.02	.02	.00	14.	
1.01	9.45	117	.07	.06	.01	38.	1.01	22.15	267	.02	.02	.00	14.	
1.01	9.50	118	.07	.06	.01	39.	1.01	22.20	268	.02	.02	.00	14.	
1.01	9.55	119	.07	.06	.01	39.	1.01	22.25	269	.02	.02	.00	14.	
1.01	10.00	120	.07	.06	.01	39.	1.01	22.30	270	.02	.02	.00	14.	
1.01	10.05	121	.07	.06	.01	39.	1.01	22.35	271	.02	.02	.00	14.	
1.01	10.10	122	.07	.06	.01	39.	1.01	22.40	272	.02	.02	.00	14.	
1.01	10.15	123	.07	.06	.01	40.	1.01	22.45	273	.02	.02	.00	14.	
1.01	10.20	124	.07	.06	.01	40.	1.01	22.50	274	.02	.02	.00	14.	
1.01	10.25	125	.07	.06	.01	40.	1.01	22.55	275	.02	.02	.00	14.	
1.01	10.30	126	.07	.06	.01	40.	1.01	23.00	276	.02	.02	.00	14.	
1.01	10.35	127	.07	.06	.01	40.	1.01	23.05	277	.02	.02	.00	14.	
1.01	10.40	128	.07	.06	.01	40.	1.01	23.10	278	.02	.02	.00	14.	
1.01	10.45	129	.07	.06	.01	41.	1.01	23.15	279	.02	.02	.00	14.	
1.01	10.50	130	.07	.06	.01	41.	1.01	23.20	280	.02	.02	.00	14.	
1.01	10.55	131	.07	.06	.01	41.	1.01	23.25	281	.02	.02	.00	14.	
1.01	11.00	132	.07	.06	.01	41.	1.01	23.30	282	.02	.02	.00	14.	
1.01	11.05	133	.07	.06	.01	41.	1.01	23.35	283	.02	.02	.00	14.	
1.01	11.10	134	.07	.06	.01	41.	1.01	23.40	284	.02	.02	.00	14.	
1.01	11.15	135	.07	.06	.01	41.	1.01	23.45	285	.02	.02	.00	14.	
1.01	11.20	136	.07	.06	.01	41.	1.01	23.50	286	.02	.02	.00	14.	
1.01	11.25	137	.07	.06	.01	42.	1.01	23.55	287	.02	.02	.00	14.	
1.01	11.30	138	.07	.06	.01	42.	1.02	0.00	288	.02	.02	.00	14.	
1.01	11.35	139	.07	.06	.01	42.	1.02	.05	289	0.00	0.00	0.00	8.	

1.01	11.40	140	.07	.00	.01	42.	1.02	.10	290	0.00	0.00	0.00	2.	
1.01	11.45	141	.07	.00	.01	42.	1.02	.15	291	0.00	0.00	0.00	1.	
1.01	11.50	142	.07	.00	.01	42.	1.02	.20	292	0.00	0.00	0.00	0.	
1.01	11.55	143	.07	.00	.01	42.	1.02	.25	293	0.00	0.00	0.00	0.	
1.01	12.00	144	.07	.00	.01	42.	1.02	.30	294	0.00	0.00	0.00	0.	
1.01	12.05	145	.01	.13	.02	81.	1.02	.35	295	0.00	0.00	0.00	0.	
1.01	12.10	146	.21	.13	.02	114.	1.02	.40	296	0.00	0.00	0.00	0.	
1.01	12.15	147	.21	.13	.02	125.	1.02	.45	297	0.00	0.00	0.00	0.	
1.01	12.20	148	.21	.13	.02	124.	1.02	.50	298	0.00	0.00	0.00	0.	
1.01	12.25	149	.21	.13	.02	130.	1.02	.55	299	0.00	0.00	0.00	0.	
1.01	12.30	150	.21	.13	.02	151.	1.02	1.00	300	0.00	0.00	0.00	0.	
									SUM	32.63	29.47	3.16	20280.	
										(829.)(	748.)(	80.)(	574.27)	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1309.	232.	70.	68.	20303.
CMS	37.	7.	2.	2.	575.
INCHES		24.06	29.47	29.47	29.47
MM		611.11	748.62	748.62	748.62
AC-FT		115.	140.	140.	140.
THOUS CU M		142.	172.	172.	172.

HYDROGRAPH AT STALAKE 1 FOR PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	3.	7.	12.	14.	16.	17.	19.	19.	21.
22.	22.	23.	24.	25.	26.	27.	27.	28.	29.
29.	30.	30.	31.	31.	32.	32.	33.	33.	33.
34.	34.	35.	35.	36.	36.	36.	36.	36.	37.
37.	37.	38.	38.	38.	38.	38.	39.	39.	39.
39.	39.	40.	40.	40.	40.	40.	40.	41.	41.
41.	41.	41.	41.	41.	41.	42.	42.	42.	42.
42.	42.	42.	42.	51.	114.	125.	129.	130.	131.
131.	132.	132.	133.	133.	134.	146.	157.	161.	162.
163.	163.	164.	164.	164.	165.	165.	165.	184.	201.
206.	208.	208.	209.	209.	209.	210.	210.	210.	210.
173.	199.	240.	310.	392.	724.	1339.	1166.	731.	508.
367.	292.	241.	211.	213.	201.	200.	200.	200.	200.
200.	200.	200.	200.	181.	164.	159.	156.	157.	157.
157.	157.	157.	157.	157.	157.	93.	38.	21.	16.
15.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	14.	14.	14.	14.	14.	14.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1309.	232.	70.	68.	20303.
CMS	37.	7.	2.	2.	575.

INCHES	24.26	29.47	29.47	29.47
MM	616.11	748.62	748.62	748.62
AC-FT	115.	140.	140.	140.
THOUS CU M	142.	172.	172.	172.

HYDROGRAPH AT STALAKE 1 FOR PLAN 1, RATIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	6.	6.	7.	8.	8.	9.	10.	10.
11.	11.	12.	12.	13.	13.	13.	14.	14.	14.
15.	15.	15.	15.	16.	16.	16.	16.	17.	17.
17.	17.	17.	17.	18.	18.	18.	18.	18.	18.
19.	19.	19.	19.	19.	19.	19.	19.	19.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	21.	21.	21.	21.	21.	21.	21.	21.
21.	21.	21.	21.	49.	57.	61.	64.	65.	65.
66.	66.	66.	69.	67.	67.	75.	79.	80.	81.
71.	72.	82.	82.	82.	82.	87.	88.	99.	100.
103.	104.	104.	104.	104.	105.	105.	105.	105.	105.
37.	110.	120.	120.	195.	195.	362.	654.	585.	364.
146.	146.	123.	123.	123.	123.	123.	123.	109.	100.
100.	100.	100.	100.	96.	82.	82.	79.	79.	79.
79.	79.	79.	79.	79.	79.	64.	19.	11.	8.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	4.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	674.	110.	35.	34.	13152.
CMS	19.	3.	1.	1.	367.
INCHES		12.13	14.74	14.74	14.74
MM		308.06	374.31	374.31	374.31
AC-FT		58.	70.	70.	70.
THOUS CU M		71.	86.	86.	86.

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COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS FROM LAKE 2 AND 1

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 1		2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT LAKE 1 PLAN 1 RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	3.	3.	3.	3.
5.	3.	7.	14.	17.	19.	21.	23.	24.	25.
27.	28.	29.	30.	31.	32.	33.	34.	35.	35.
36.	37.	38.	38.	39.	39.	40.	41.	41.	42.
42.	43.	43.	44.	44.	44.	45.	45.	45.	46.
46.	46.	47.	47.	47.	48.	48.	48.	48.	49.
49.	49.	49.	50.	50.	50.	50.	50.	51.	51.
51.	51.	51.	51.	52.	52.	52.	52.	52.	52.
52.	53.	53.	53.	96.	137.	155.	158.	161.	162.
165.	194.	195.	196.	196.	197.	131.	194.	199.	201.
202.	203.	204.	204.	205.	205.	206.	206.	227.	247.
254.	257.	259.	260.	260.	261.	261.	261.	262.	262.
223.	207.	292.	373.	477.	900.	1683.	1428.	907.	645.
471.	382.	316.	276.	270.	266.	264.	262.	250.	249.
248.	249.	247.	247.	246.	246.	198.	197.	196.	196.
196.	196.	196.	196.	196.	196.	119.	47.	26.	20.
19.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
19.	18.	18.	18.	18.	18.	18.	19.	18.	18.
18.	18.	18.	18.	18.	18.	18.	19.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	19.	3.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1680.	291.	98.	85.	253[illegible].
CMS	47.	8.	2.	2.	719.
INCHES		24.35	29.56	29.56	29.56
MM		618.56	751.07	750.97	750.97
AC-FT		144.	175.	175.	175.
THOUS CU M		178.	216.	216.	216.

SUM OF 2 HYDROGRAPHS AT LAKE 1 PLAN 1 RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	4.	7.	9.	10.	11.	11.	12.	13.
13.	14.	14.	15.	16.	16.	16.	17.	17.	18.
18.	18.	19.	19.	19.	20.	20.	20.	21.	21.
21.	21.	22.	22.	22.	22.	22.	23.	23.	23.
23.	23.	23.	24.	24.	24.	24.	24.	24.	24.
24.	25.	25.	25.	25.	25.	25.	25.	25.	25.
25.	26.	26.	26.	26.	26.	26.	26.	26.	26.
26.	26.	26.	26.	48.	69.	76.	79.	81.	81.

82.	82.	82.	83.	83.	83.	90.	97.	100.	101.
101.	102.	102.	102.	102.	103.	103.	103.	114.	124.
127.	129.	130.	130.	130.	130.	131.	131.	131.	131.
111.	123.	147.	187.	236.	422.	794.	729.	467.	334.
248.	198.	164.	145.	142.	141.	139.	137.	136.	126.
125.	125.	125.	125.	113.	102.	99.	98.	98.	98.
98.	98.	98.	98.	98.	98.	59.	24.	13.	10.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	5.	2.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	734.	144.	44.	42.	1279.
CMS	22.	4.	1.	1.	36.
INCHES		12.22	14.83	14.83	14.83
PV		510.39	376.61	376.61	376.61
AC-FT		72.	88.	88.	88.
THOUS CU M		89.	108.	108.	108.

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HYDROGRAPH ROUTING

ROUTE COMBINED HYDROGRAPH THROUGH DAM 1

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-700.	-1

STAGE	700.25	701.70	703.10	703.80	704.50	705.20	706.00
FLOW	0.00	45.00	137.00	451.00	957.00	1646.00	2465.00
SURFACE AREA=	0.	1.	1.	3.	5.	10.	14.	18.	22.
CAPACITY=	0.	3.	5.	17.	53.	125.	241.	401.	601.
ELEVATION=	693.	701.	703.	710.	720.	730.	740.	750.	760.

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
700.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
703.0	0.0	0.0	0.

DAM BREACH DATA

BRWID	Z	ELBR	TFAIL	WSEL	FAILEL
10.	.00	700.00	1.00	700.25	705.00

STATION LAKE 1, PLAN 1, RATIO 1

BEGIN DAM FAILURE AT 12.47 HOURS

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
3.	3.	3.	6.	7.	9.	12.	14.	16.	17.
19.	21.	23.	25.	26.	26.	27.	28.	29.	30.
31.	32.	33.	34.	35.	36.	36.	37.	38.	39.
39.	40.	40.	41.	41.	42.	42.	43.	44.	44.
45.	45.	46.	46.	47.	47.	47.	48.	48.	49.
49.	49.	49.	49.	49.	49.	50.	50.	50.	50.
50.	51.	51.	51.	51.	51.	52.	52.	52.	52.
52.	52.	52.	53.	61.	82.	105.	124.	138.	163.
184.	197.	172.	178.	181.	183.	195.	208.	216.	217.
223.	228.	235.	241.	244.	245.	246.	236.	234.	229.
244.	242.	241.	238.	240.	240.	241.	241.	241.	262.
294.	349.	440.	719.	1144.	1594.	1891.	1940.	1688.	1099.
827.	603.	433.	334.	298.	272.	267.	265.	258.	252.
250.	250.	249.	248.	241.	233.	226.	201.	198.	197.
196.	196.	196.	196.	196.	196.	170.	114.	77.	53.
28.	18.	20.	22.	21.	17.	19.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	19.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	18.	18.	18.	18.	18.
18.	18.	18.	18.	18.	16.	16.	18.	16.	15.
9.	6.	4.	3.	3.	2.	2.	2.	2.	1.

STORAGE

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	4.
4.	4.	4.	4.	4.	4.	4.	5.	5.	5.
5.	5.	5.	5.	5.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.

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```
           4.        4.        4.        4.        4.        4.        4.        4.        4.        4.
           4.        4.        4.        5.        5.        6.        7.        7.        6.        5.
           5.        5.        5.        5.        4.        4.        4.        4.        4.        4.
           4.        4.        4.        4.        4.        4.        4.        4.        4.        4.
           4.        4.        4.        4.        4.        4.        4.        3.        3.        3.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
           2.        2.        2.        2.        2.        2.        2.        2.        2.        2.

                                             STAGE
        700.3     700.3     700.3     700.3     700.3     700.3     700.3     700.4     700.3     700.3
        700.3     700.3     701.3     700.3     700.3     700.3     700.3     700.4     700.3     700.3
        700.3     700.3     700.5     700.3     700.3     700.2     700.3     700.3     700.3     700.3
        700.3     700.3     700.3     700.3     700.3     700.3     700.3     700.3     700.4     700.3
        700.3     700.3     700.3     700.3     700.3     700.7     700.3     700.3     700.3     700.3
        700.3     700.3     700.3     700.3     700.3     700.5     700.3     700.3     700.3     700.3
        700.3     700.3     700.7     700.3     700.3     700.8     700.3     700.3     700.3     700.3
        700.3     700.3     700.4     700.4     700.5     700.6     700.5     700.7     700.8     700.8
        700.9     700.9     701.0     701.1     701.1     701.1     701.2     701.2     701.2     701.3
        701.3     701.3     701.4     701.4     701.4     701.5     701.5     701.5     701.5     701.5
        701.6     701.6     701.6     701.6     701.6     701.7     701.7     701.7     701.7     701.7
        701.7     701.7     701.7     701.7     701.8     701.8     701.8     701.9     701.8     701.8
        701.9     701.8     701.8     701.9     701.9     701.8     701.8     701.8     701.8     701.8
        701.9     701.8     701.9     701.9     701.8     701.8     701.8     701.8     701.9     701.8
        701.8     701.8     701.9     701.9     702.2     702.7     702.6     702.9     703.1     703.1
        703.1     703.1     703.1     703.0     702.9     702.8     702.7     702.7     702.5     702.5
        702.4     702.9     702.5     702.3     702.3     702.3     702.3     702.5     702.4     702.3
        702.6     702.6     702.7     702.7     702.7     702.7     702.7     702.7     702.7     702.7
        702.5     702.6     702.7     703.0     703.3     702.9     704.7     704.7     704.1     703.8
        703.5     703.2     703.1     703.0     702.8     702.8     702.7     702.7     702.7     702.6
        702.6     702.6     702.0     702.5     702.6     702.5     702.4     702.4     702.3     702.3
        702.3     702.3     702.3     702.5     702.3     702.3     702.1     701.7     701.3     701.0
        700.8     700.7     700.5     700.6     700.5     700.5     700.5     700.5     700.5     700.5
        700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5
        700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5
        700.5     700.5     700.5     700.4     700.5     700.5     700.5     700.5     700.5     700.5
        700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5
        700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5     700.5
        700.5     700.5     700.4     700.5     700.5     700.5     700.5     700.5     700.5     700.4
        700.3     700.3     700.2     700.2     700.2     700.2     700.2     700.1     700.1     700.1

   PEAK OUTFLOW IS    1949. AT TIME  15.67 HOURS

                               PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                      CFS      1969.     291.       86.        85.        25415.
                      CMS        44.       8.        2.         2.          720.
                   INCHES               24.42     29.58      29.58         29.58
                       MM              620.22    751.37     751.37        751.37
                    AC-FT                144.      175.       175.          175.
               THOUS CU M                178.      216.       216.          216.
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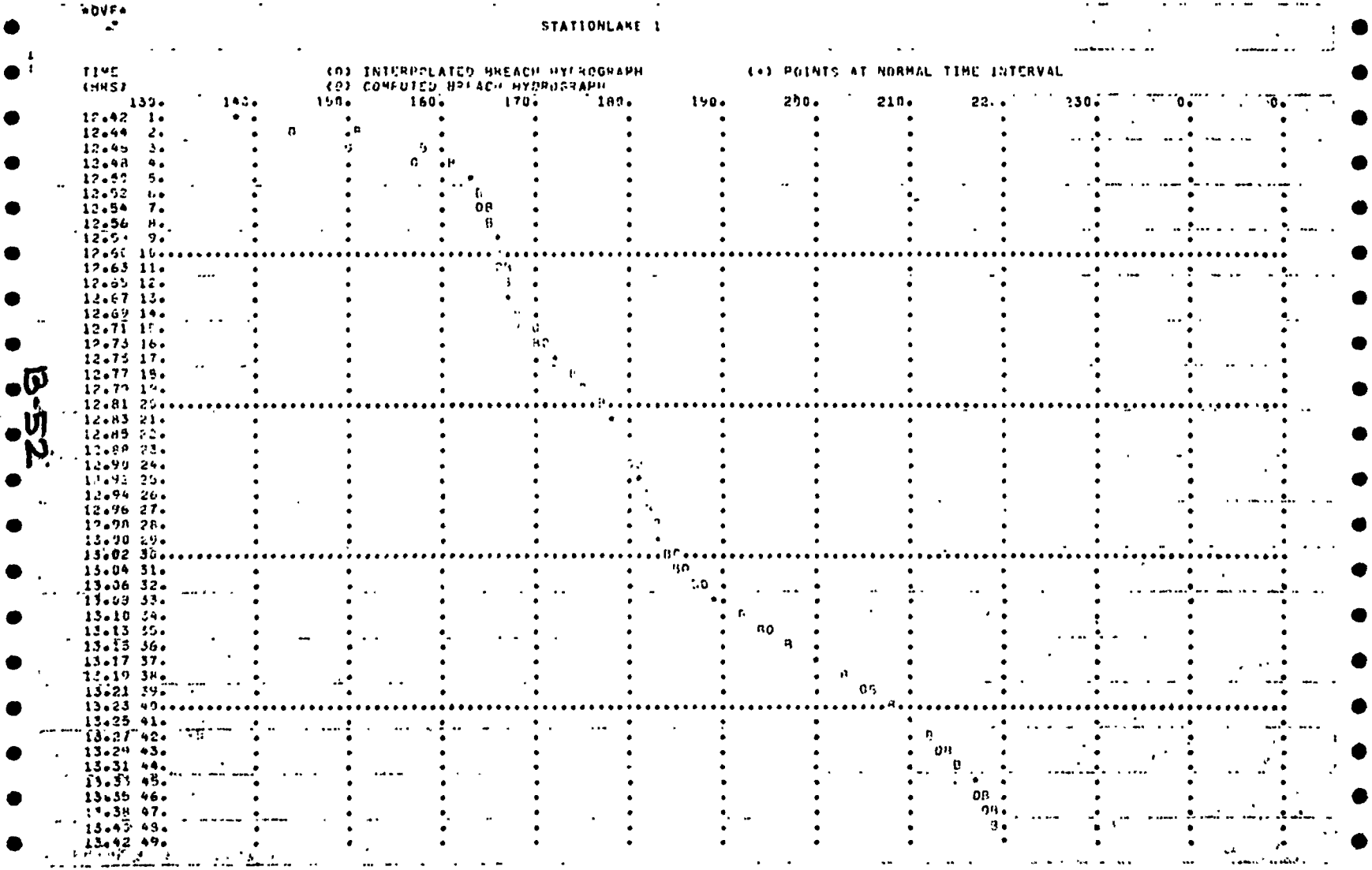
THE DAM BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF .021 HOURS DURING BREACH FORMATION.
DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .083 HOURS.
THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH.
INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	-	COMPUTED BREACH HYDROGRAPH (CFS)	=	ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (AC-FT)
12.417	0.000	128.		136.		9.	0.	0.
[illegible]	.021	144.		151.		-7.	-7.	-0.
[illegible]	.042	150.		158.		-7.	-14.	-0.
12.479	.063	157.		161.		-4.	-19.	-0.
12.500	.083	163.		163.		0.	-19.	-0.
12.521	.104	164.		164.		-3.	-19.	-0.
12.542	.125	164.		165.		-0.	-19.	-0.
12.563	.146	166.		166.		-0.	-20.	-0.
12.583	.167	166.		166.		0.	-20.	-0.
12.604	.188	166.		166.		-0.	-20.	-0.
12.625	.208	166.		167.		-0.	-20.	-0.
12.646	.229	167.		167.		-0.	-20.	-0.
12.667	.250	167.		167.		0.	-20.	-0.
12.688	.271	168.		169.		1.	-19.	-0.
12.708	.292	170.		168.		2.	-17.	-0.
12.729	.313	171.		170.		1.	-18.	-0.
12.750	.333	172.		170.		3.	-15.	-0.
12.771	.354	174.		174.		-0.	-15.	-0.
12.792	.375	174.		174.		-0.	-17.	-0.
12.813	.396	177.		177.		-0.	-17.	-0.
12.833	.417	177.		177.		0.	-17.	-0.
12.854	.438	178.		178.		-0.	-17.	-0.
12.875	.458	180.		180.		-0.	-18.	-0.
12.896	.479	181.		181.		-0.	-18.	-0.
12.917	.500	181.		181.		0.	-18.	-0.
12.938	.521	182.		182.		0.	-18.	-0.
12.958	.542	182.		182.		0.	-18.	-0.
12.979	.563	183.		183.		0.	-18.	-0.
13.000	.583	183.		184.		0.	-18.	-0.
13.021	.604	185.		184.		1.	-17.	-0.
13.042	.625	186.		185.		1.	-16.	-0.
13.063	.646	186.		187.		1.	-15.	-0.
13.083	.667	189.		189.		0.	-15.	-0.
13.104	.688	190.		190.		0.	-15.	-0.
13.125	.708	190.		190.		0.	-15.	-0.
13.146	.729	191.		191.		0.	-14.	-0.
13.167	.750	203.		203.		0.	-15.	-0.
13.188	.771	203.		203.		-0.	-15.	-0.
13.208	.792	205.		204.		-0.	-15.	-0.
13.229	.813	205.		206.		-0.	-16.	-0.
13.250	.833	210.		210.		0.	-16.	-0.
13.271	.854	212.		212.		-0.	-16.	-0.
13.292	.875	213.		214.		-0.	-17.	-0.
13.313	.896	215.		215.		-0.	-17.	-0.
13.333	.917	217.		217.		0.	-17.	-0.
13.354	.937	217.		218.		-0.	-17.	-0.
13.375	.958	218.		219.		-0.	-17.	-0.
13.396	.979	218.		219.		-0.	-18.	-0.
13.417	1.000	220.		220.		0.	-18.	-0.


STATIONLAKE 1
TIME (HRS)
(O) INTERPOLATED BREACH HYDROGRAPH
(O) COMPUTED BREACH HYDROGRAPH
(+) POINTS AT NORMAL TIME INTERVAL
130. 140. 150. 160. 170. 180. 190. 200. 210. 220. 230. 0. 0.
12.42 1.
12.44 2.
12.46 3.
12.48 4.
12.50 5.
12.52 6.
12.54 7.
12.56 8.
12.58 9.
13.00 10.
13.02 11.
13.04 12.
13.06 13.
13.08 14.
13.10 15.
13.12 16.
13.14 17.
13.16 18.
13.18 19.
13.20 20.
13.23 21.
13.25 22.
13.27 23.
13.29 24.
13.31 25.
13.33 26.
13.35 27.
13.37 28.
13.39 29.
13.41 30.
13.43 31.
13.45 32.
13.47 33.
13.49 34.
13.51 35.
13.53 36.
13.55 37.
13.57 38.
13.59 39.
14.01 40.
14.03 41.
14.05 42.
14.07 43.
14.09 44.
14.11 45.
14.13 46.
14.15 47.
14.17 48.
14.19 49.

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*OVR*
                                        STATION LAKE 1, PLAN 1, RATIO 2

BEGIN DAM FAILURE AT 15.33 HOURS

                                        END-OF-PERIOD HYDROGRAPH ORDINATES

                                                   OUTFLOW
          [illegible]       0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
          0.        0.        0.        0.        1.        1.        1.        1.        1.        1.
          1.        1.        1.        1.        1.        1.        1.        1.        1.        1.
          1.        1.        [illegible]        2.        4.        6.        6.        7.        8.        9.
         10.       10.       11.       12.       13.       13.       14.       14.       15.       15.
         16.       16.       17.       17.       17.       18.       18.       19.       19.       19.
         20.       21.       20.       20.       21.       21.       21.       21.       22.       22.
         22.       22.       22.       [illegible]       [illegible]       23.       24.       23.       23.       24.
         23.       24.       24.       24.       24.       24.       25.       25.       25.       25.
         25.       25.       [illegible]       [illegible]       25.       25.       26.       26.       26.       26.
         26.       26.       33.       [illegible]       [illegible]       34.       41.       53.       57.       70.
         74.       77.       73.       [illegible]       81.       82.       84.       87.       92.       95.
         97.       [illegible]      100.      103.      101.      103.      132.      102.      105.      110.
        117.      123.      124.      125.      124.      128.      129.      129.      130.      130.
        127.      128.      127.      154.      232.      [illegible]      71[illegible].      747.      531.      380.
        274.      271.      213.      176.      171.      [illegible]      149.      142.      135.      134.
        121.      12[illegible].      12[illegible].      12[illegible].      121.      112.      1[illegible].      10[illegible].      101.       64.
         84.       98.       [illegible]       [illegible]       31.       91.       53.       47.       46.       32.
         23.       17.       14.       13.       11.       10.       10.        4.        9.        9.
          [illegible]        9.        [illegible]        [illegible]        [illegible]        9.        9.        4.        4.        9.
          9.        9.        [illegible]        [illegible]        9.        9.        [illegible]        3.        5.        9.
          7.        9.        [illegible]        9.        9.        6.        4.        9.        9.        9.
          9.        9.        [illegible]        9.        [illegible]        9.        [illegible]        5.        9.        9.
          9.        9.        9.        9.        9.        9.        7.        9.        9.        9.
          9.        7.        9.        9.        9.        9.        9.        9.        8.        7.
          9.        4.        4.        3.        [illegible]        2.        2.        1.        1.        1.

                                                   STORAGE
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        2.        2.        2.        2.        2.        2.        2.
          2.        2.        2.        3.        3.        3.        3.        3.        3.        3.
          3.        3.        3.        3.        3.        3.        3.        3.        3.        3.
          3.        3.        3.        3.        3.        3.        3.        3.        3.        3.
          3.        3.        3.        3.        3.        3.        3.        3.        3.        3.
          3.        3.        3.        3.        3.        3.        3.        3.        3.        3.
          3.        3.        3.        3.        3.        3.        3.        4.        4.        4.
          4.        4.        4.        4.        4.        4.        4.        4.        4.        4.
          4.        4.        4.        4.        4.        4.        4.        4.        4.        4.
          4.        5.        5.        5.        5.        5.        5.        5.        5.        5.
          5.        5.        5.        5.        5.        5.        6.        6.        5.        5.
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5.	5.	4.	4.	4.	4.	4.	4.	4.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	2.
2.	2.	2.	2.	3.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

STAGE

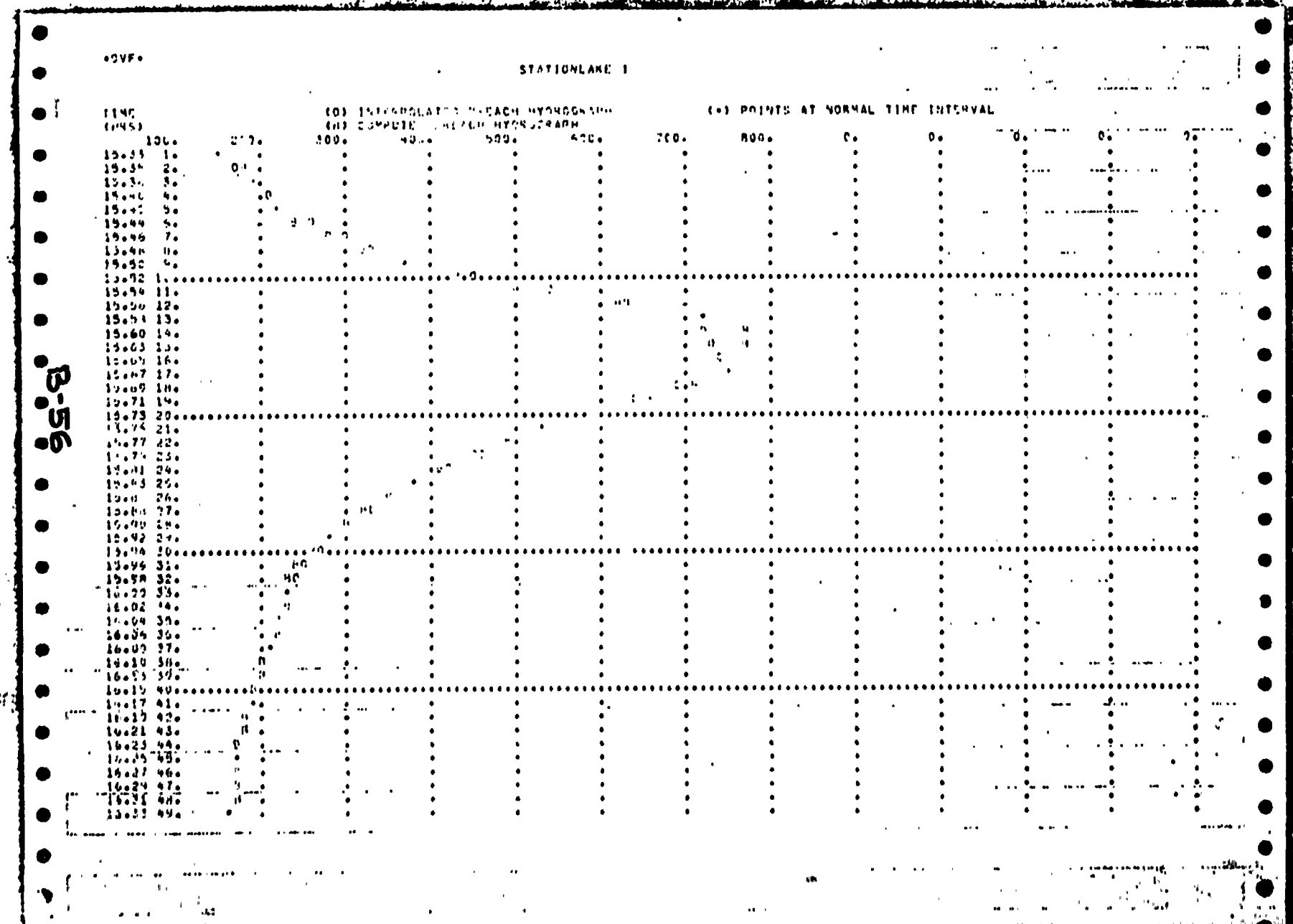
700.3	700.3	700.3	700.[illegible]	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.[illegible]	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.[illegible]	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	[illegible]	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.[illegible]	700.3	700.3	700.3	700.[illegible]	700.3
700.5	700.5	700.5	700.5	700.4	700.4	700.4	700.5	700.5	700.8
700.6	700.6	700.6	700.7	700.7	700.7	700.7	700.7	700.8	700.9
700.[illegible]	700.8	700.8	700.[illegible]	700.8	700.9	700.9	700.[illegible]	700.9	700.9
700.9	700.[illegible]	700.[illegible]	700.9	700.[illegible]	701.0	701.0	701.0	701.0	701.0
701.0	701.0	701.0	701.0	701.0	701.0	701.0	701.0	701.0	701.0
701.1	701.1	701.1	701.1	701.1	701.1	701.1	701.1	701.1	701.1
701.1	701.1	701.1	701.1	701.1	701.1	701.1	701.1	701.1	701.1
701.1	701.1	701.1	701.1	701.2	701.4	701.5	701.8	702.0	702.1
702.2	702.2	702.[illegible]	702.[illegible]	702.3	702.3	702.3	702.4	702.4	702.8
702.5	702.5	702.5	702.6	702.6	702.6	702.6	702.[illegible]	702.[illegible]	702.7
702.8	702.9	702.9	702.9	703.0	703.0	703.0	703.0	703.0	703.0
702.9	702.9	703.0	703.1	703.3	703.5	704.1	704.1	703.8	703.4
703.2	703.0	702.8	702.3	702.2	702.1	701.9	701.7	701.9	701.9
701.8	701.[illegible]	701.8	701.5	701.7	701.7	701.6	701.6	701.5	701.5
701.3	701.3	701.5	701.5	701.5	701.5	701.4	701.2	700.9	700.7
700.6	700.5	700.4	700.4	700.4	700.4	700.4	700.5	700.7	700.5
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3	700.3
700.3	700.2	700.2	700.2	700.2	700.2	700.1	700.1	700.1	700.1

PEAK OUTFLOW IS 772. AT TIME 15.63 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	747.	146.	99.	43.	12754.
CMS	21.	4.	1.	1.	361.
INCHES		12.24	14.84	14.84	14.84
MM		311.01	377.06	377.06	377.06
AC-FT		73.	88.	88.	88.
THOUS CU M		89.	108.	108.	108.

THE TAP BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF .021 HOURS DURING BREACH FORMATION.
DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .083 HOURS.
THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH.
INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	-	COMPUTED 1 EACH HYDROGRAPH (CFS)	=	ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (AC-FT)
15.729	0.000	156.		156.		0.	0.	0.
15.750	.021	171.		177.		-6.	-6.	-0.
15.771	.042	194.		205.		-11.	-17.	-0.
15.792	.063	235.		250.		-15.	-32.	-0.
15.813	.083	222.		222.		0.	-32.	-0.
15.833	.104	248.		234.		14.	-18.	-0.
15.854	.125	292.		278.		14.	-4.	-0.
15.875	.146	332.		332.		0.	-4.	-0.
15.896	.167	361.		361.		0.	-4.	-0.
15.917	.188	405.		427.		-22.	-26.	-0.
15.938	.208	502.		515.		-13.	-39.	-0.
15.958	.229	634.		617.		17.	-22.	-0.
15.979	.250	715.		715.		0.	-22.	-0.
16.000	.271	723.		769.		-46.	-68.	-0.
16.021	.292	771.		771.		-41.	-109.	-0.
16.042	.313	751.		761.		-10.	-119.	-0.
16.063	.333	747.		747.		0.	-119.	-0.
16.083	.354	714.		714.		0.	-119.	-0.
16.104	.375	668.		668.		0.	-119.	-0.
16.125	.396	615.		615.		0.	-119.	-0.
16.146	.417	551.		551.		0.	-119.	-0.
16.167	.438	496.		496.		0.	-119.	-0.
16.188	.458	448.		448.		0.	-119.	-0.
16.208	.479	414.		414.		0.	-119.	-0.
16.229	.500	392.		392.		0.	-119.	-0.
16.250	.521	368.		368.		0.	-119.	-0.
16.271	.542	339.		339.		0.	-119.	-0.
16.292	.563	304.		304.		0.	-119.	-0.
16.313	.583	279.		279.		0.	-119.	-0.
16.333	.604	267.		260.		7.	-112.	-0.
16.354	.625	235.		246.		-11.	-123.	-0.
16.375	.646	241.		251.		-10.	-133.	-0.
16.396	.667	231.		231.		0.	-133.	-0.
16.417	.688	226.		227.		-1.	-134.	-0.
16.438	.708	221.		222.		-2.	-136.	-0.
16.458	.729	215.		219.		-4.	-140.	-0.
16.479	.750	213.		217.		-5.	-145.	-0.
16.500	.771	204.		204.		0.	-145.	-0.
16.521	.792	198.		197.		3.	-142.	-0.
16.542	.812	192.		192.		0.	-142.	-0.
16.563	.833	186.		186.		0.	-142.	-0.
16.583	.854	182.		181.		1.	-141.	-0.
16.604	.875	178.		177.		2.	-139.	-0.
16.625	.896	175.		174.		1.	-138.	-0.
16.646	.917	171.		171.		0.	-138.	-0.
16.667	.937	169.		169.		1.	-137.	-0.
16.688	.958	168.		167.		1.	-136.	-0.
16.708	.979	166.		166.		0.	-136.	-0.
16.729	1.000	165.		165.		0.	-136.	-0.


•OVF•
STATIONLAKE 1
TIME
(HRS)
(O) INTERPOLATED EACH HYDROGRAPH
(H) COMPUTED MEAN HYDROGRAPH
(•) POINTS AT NORMAL TIME INTERVAL
100• 200• 300• 400• 500• 600• 700• 800• 0• 0• 0• 0• 0•
15.31 1•
15.34 2•
15.36 3•
15.40 4•
15.42 5•
15.44 6•
15.46 7•
15.48 8•
15.50 9•
15.52 10•
15.54 11•
15.56 12•
15.58 13•
15.60 14•
15.63 15•
15.65 16•
15.67 17•
15.69 18•
15.71 19•
15.73 20•
15.75 21•
15.77 22•
15.79 23•
16.01 24•
16.03 25•
16.05 26•
16.08 27•
16.10 28•
16.12 29•
16.14 30•
16.16 31•
16.18 32•
16.20 33•
16.22 34•
16.24 35•
16.26 36•
16.28 37•
16.30 38•
16.33 39•
16.35 40•
16.37 41•
16.39 42•
16.41 43•
16.43 44•
16.45 45•
16.47 46•
16.49 47•
16.51 48•
16.53 49•

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SUB-AREA RUNOFF COMPUTATION

RUNOFF CALCULATION FOR DRAINAGE AREA 4

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 4	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.01	0.10	.01	1.00	0.000	0	0	0

PRECIP DATA

SPFE	P6	P	P12	P24	P48	P72	P96
0.00	25.12	100.00	100.00	100.00	0.00	0.00	0.00

LOSS DATA

LKRTI	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOR	STRTL	CNSTL	ALSMX	RTIMP
0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-82.00	0.00	0.00	

CURVE NO = -82.00 EFINFSS = -1.00 EFFECT CN = 82.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= .01

RECESSION DATA

STRTQ= 0.00 QRCSN= 0.00 RTIOR= 1.00

TIME INCREMENT TOO LARGE--(NHG IS GT LAG/2)

UNIT HYDROGRAPH 4 END OF PERIOD ORDINATES, TC= 0.00 HOURS, LAG= .01 VOL= 1.00

46. 10. 4. 1. 0.

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	0.00	.01	0.	1.01	12.35	151	.21	.20	.01	18.
1.01	.10	2	.01	0.00	.01	0.	1.01	12.40	152	.21	.20	.01	18.
1.01	.15	3	.01	0.00	.01	0.	1.01	12.45	153	.21	.20	.01	18.
1.01	.20	4	.01	0.00	.01	0.	1.01	12.50	154	.21	.20	.01	18.
1.01	.25	5	.01	0.00	.01	0.	1.01	12.55	155	.21	.20	.01	18.
1.01	.30	6	.01	0.00	.01	0.	1.01	13.00	156	.21	.20	.01	19.
1.01	.35	7	.01	0.00	.01	0.	1.01	13.05	157	.25	.24	.01	21.
1.01	.40	8	.01	0.00	.01	0.	1.01	13.10	158	.25	.24	.01	22.
1.01	.45	9	.01	0.00	.01	0.	1.01	13.15	159	.25	.24	.01	22.
1.01	.50	10	.01	0.00	.01	0.	1.01	13.20	160	.25	.24	.01	22.
1.01	.55	11	.01	0.00	.01	0.	1.01	13.25	161	.25	.24	.01	22.
1.01	1.00	12	.01	0.00	.01	0.	1.01	13.30	162	.25	.24	.01	22.
1.01	1.05	13	.01	0.00	.01	0.	1.01	13.35	163	.25	.24	.01	23.
1.01	1.10	14	.01	0.00	.01	0.	1.01	13.40	164	.25	.24	.01	23.
1.01	1.15	15	.01	0.00	.01	0.	1.01	13.45	165	.25	.24	.01	23.
1.01	1.20	16	.01	0.00	.01	0.	1.01	13.50	166	.25	.24	.01	23.
1.01	1.25	17	.01	0.00	.01	0.	1.01	13.55	167	.25	.24	.01	23.
1.01	1.30	18	.01	0.00	.01	0.	1.01	14.00	168	.25	.24	.01	23.
1.01	1.35	19	.01	0.00	.01	0.	1.01	14.05	169	.31	.31	.01	27.

1.01	1.40	20	.01	0.00	.01	0.	1.01	14.10	170	.31	.31	.01	28.
1.01	1.45	21	.01	0.00	.01	0.	1.01	14.15	171	.31	.31	.01	28.
1.01	1.50	22	.01	0.00	.01	0.	1.01	14.20	172	.31	.31	.01	28.
1.01	1.55	23	.01	0.00	.01	0.	1.01	14.25	173	.31	.31	.01	28.
1.01	2.00	24	.01	0.00	.01	0.	1.01	14.30	174	.31	.31	.01	29.
1.01	2.05	25	.01	0.00	.01	0.	1.01	14.35	175	.31	.31	.01	29.
1.01	2.10	26	.01	0.00	.01	0.	1.01	14.40	176	.31	.31	.01	29.
1.01	2.15	27	.01	0.00	.01	0.	1.01	14.45	177	.31	.31	.01	29.
1.01	2.20	28	.01	0.00	.01	0.	1.01	14.50	178	.31	.31	.01	29.
1.01	2.25	29	.01	0.00	.01	0.	1.01	14.55	179	.31	.31	.01	29.
1.01	2.30	30	.01	0.00	.01	0.	1.01	15.00	180	.31	.31	.01	29.
1.01	2.35	31	.01	0.00	.01	0.	1.01	15.05	181	.19	.19	.00	20.
1.01	2.40	32	.01	.01	.01	0.	1.01	15.10	182	.38	.38	.01	31.
1.01	2.45	33	.01	.01	.01	0.	1.01	15.15	183	.39	.39	.01	34.
1.01	2.50	34	.01	.01	.01	0.	1.01	15.20	184	.57	.56	.01	48.
1.01	2.55	35	.01	.01	.01	0.	1.01	15.25	185	.67	.66	.01	58.
1.01	3.00	36	.01	.01	.01	0.	1.01	15.30	186	1.62	1.60	.02	126.
1.01	3.05	37	.01	.01	.01	0.	1.01	15.35	187	2.67	2.64	.03	216.
1.01	3.10	38	.01	.01	.01	0.	1.01	15.40	188	1.65	1.64	.01	129.
1.01	3.15	39	.01	.01	.01	0.	1.01	15.45	189	.67	.66	.01	77.
1.01	3.20	40	.01	.01	.01	0.	1.01	15.50	190	.57	.57	.00	58.
1.01	3.25	41	.01	.01	.01	0.	1.01	15.55	191	.38	.34	.00	40.
1.01	3.30	42	.01	.01	.01	0.	1.01	16.00	192	.58	.58	.00	56.
1.01	3.35	43	.01	.01	.01	0.	1.01	16.05	193	.29	.26	.03	34.
1.01	3.40	44	.01	.01	.01	0.	1.01	16.10	194	.29	.29	.00	27.
1.01	3.45	45	.01	.01	.01	0.	1.01	16.15	195	.29	.29	.00	27.
1.01	3.50	46	.01	.01	.01	0.	1.01	16.20	196	.29	.29	.00	27.
1.01	3.55	47	.01	.01	.01	0.	1.01	16.25	197	.29	.29	.00	27.
1.01	4.00	48	.01	.01	.01	0.	1.01	16.30	198	.29	.29	.00	27.
1.01	4.05	49	.01	.01	.01	0.	1.01	16.35	199	.29	.29	.00	27.
1.01	4.10	50	.01	.01	.01	0.	1.01	16.40	200	.29	.29	.00	27.
1.01	4.15	51	.01	.01	.01	0.	1.01	16.45	201	.29	.29	.00	27.
1.01	4.20	52	.01	.01	.01	0.	1.01	16.50	202	.29	.29	.00	27.
1.01	4.25	53	.01	.01	.01	0.	1.01	16.55	203	.29	.29	.00	27.
1.01	4.30	54	.01	.01	.01	0.	1.01	17.00	204	.29	.29	.00	27.
1.01	4.35	55	.01	.01	.01	0.	1.01	17.05	205	.23	.23	.00	23.
1.01	4.40	56	.01	.01	.01	0.	1.01	17.10	206	.23	.23	.00	22.
1.01	4.45	57	.01	.01	.01	0.	1.01	17.15	207	.23	.23	.00	21.
1.01	4.50	58	.01	.01	.01	0.	1.01	17.20	208	.23	.23	.00	21.
1.01	4.55	59	.01	.01	.01	0.	1.01	17.25	209	.23	.23	.00	21.
1.01	5.00	60	.01	.01	.01	0.	1.01	17.30	210	.23	.23	.00	21.
1.01	5.05	61	.01	.01	.01	0.	1.01	17.35	211	.23	.23	.00	21.
1.01	5.10	62	.01	.01	.01	0.	1.01	17.40	212	.23	.23	.00	21.
1.01	5.15	63	.01	.01	.01	0.	1.01	17.45	213	.23	.23	.00	21.
1.01	5.20	64	.01	.01	.01	0.	1.01	17.50	214	.23	.23	.00	21.
1.01	5.25	65	.01	.01	.01	0.	1.01	17.55	215	.23	.23	.00	21.
1.01	5.30	66	.01	.01	.01	0.	1.01	18.00	216	.23	.23	.00	21.
1.01	5.35	67	.01	.01	.01	0.	1.01	18.05	217	.02	.02	.00	7.
1.01	5.40	68	.01	.01	.01	0.	1.01	18.10	218	.02	.02	.00	3.
1.01	5.45	69	.01	.01	.01	0.	1.01	18.15	219	.02	.02	.00	2.
1.01	5.50	70	.01	.01	.01	0.	1.01	18.20	220	.02	.02	.00	2.
1.01	5.55	71	.01	.01	.01	0.	1.01	18.25	221	.02	.02	.00	2.
1.01	6.00	72	.01	.01	.01	0.	1.01	18.30	222	.02	.02	.00	2.
1.01	6.05	73	.07	.03	.04	2.	1.01	18.35	223	.02	.02	.00	2.
1.01	6.10	74	.07	.03	.04	3.	1.01	18.40	224	.02	.02	.00	2.
1.01	6.15	75	.07	.03	.04	3.	1.01	18.45	225	.02	.02	.00	2.
1.01	6.20	76	.07	.03	.04	3.	1.01	18.50	226	.02	.02	.00	2.
1.01	6.25	77	.07	.03	.04	3.	1.01	18.55	227	.02	.02	.00	2.
1.01	6.30	78	.07	.04	.03	3.	1.01	19.00	228	.02	.02	.00	2.
1.01	6.35	79	.07	.04	.03	3.	1.01	19.05	229	.02	.02	.00	2.

1.01	6.40	80	.07	.04	.03	4.	1.01	19.10	230	.02	.02	.00	2.	
1.01	6.45	81	.07	.04	.03	4.	1.01	19.15	231	.02	.02	.00	2.	
1.01	6.50	82	.07	.04	.03	4.	1.01	19.20	232	.02	.02	.00	2.	
1.01	6.55	83	.07	.04	.03	4.	1.01	19.25	233	.02	.02	.00	2.	
1.01	7.00	84	.07	.04	.03	4.	1.01	19.30	234	.02	.02	.00	2.	
1.01	7.05	85	.07	.04	.03	4.	1.01	19.35	235	.02	.02	.00	2.	
1.01	7.10	86	.07	.04	.02	4.	1.01	19.40	236	.02	.02	.00	2.	
1.01	7.15	87	.07	.05	.02	4.	1.01	19.45	237	.02	.02	.00	2.	
1.01	7.20	88	.07	.05	.02	4.	1.01	19.50	238	.02	.02	.00	2.	
1.01	7.25	89	.07	.05	.02	4.	1.01	19.55	239	.02	.02	.00	2.	
1.01	7.30	90	.07	.05	.02	4.	1.01	20.00	240	.02	.02	.00	2.	
1.01	7.35	91	.07	.05	.02	5.	1.01	20.05	241	.02	.02	.00	2.	
1.01	7.40	92	.07	.05	.02	5.	1.01	20.10	242	.02	.02	.00	2.	
1.01	7.45	93	.07	.05	.02	5.	1.01	20.15	243	.02	.02	.00	2.	
1.01	7.50	94	.07	.05	.02	5.	1.01	20.20	244	.02	.02	.00	2.	
1.01	7.55	95	.07	.05	.02	5.	1.01	20.25	245	.02	.02	.00	2.	
1.01	8.00	96	.07	.05	.02	5.	1.01	20.30	246	.02	.02	.00	2.	
1.01	8.05	97	.07	.05	.02	5.	1.01	20.35	247	.02	.02	.00	2.	
1.01	8.10	98	.07	.05	.02	5.	1.01	20.40	248	.02	.02	.00	2.	
1.01	8.15	99	.07	.05	.02	5.	1.01	20.45	249	.02	.02	.00	2.	
1.01	8.20	100	.07	.05	.02	5.	1.01	20.50	250	.02	.02	.00	2.	
1.01	8.25	101	.07	.05	.01	5.	1.01	20.55	251	.02	.02	.00	2.	
1.01	8.30	102	.07	.04	.01	5.	1.01	21.00	252	.02	.02	.00	2.	
1.01	8.35	103	.07	.04	.01	5.	1.01	21.05	253	.02	.02	.00	2.	
1.01	8.40	104	.07	.04	.01	5.	1.01	21.10	254	.02	.02	.00	2.	
1.01	8.45	105	.07	.04	.01	5.	1.01	21.15	255	.02	.02	.00	2.	
1.01	8.50	106	.07	.04	.01	5.	1.01	21.20	256	.02	.02	.00	2.	
1.01	8.55	107	.07	.04	.01	5.	1.01	21.25	257	.02	.02	.00	2.	
1.01	9.00	108	.07	.04	.01	5.	1.01	21.30	258	.02	.02	.00	2.	
1.01	9.05	109	.07	.04	.01	5.	1.01	21.35	259	.02	.02	.00	2.	
1.01	9.10	110	.07	.04	.01	5.	1.01	21.40	260	.02	.02	.00	2.	
1.01	9.15	111	.07	.04	.01	5.	1.01	21.45	261	.02	.02	.00	2.	
1.01	9.20	112	.07	.04	.01	5.	1.01	21.50	262	.02	.02	.00	2.	
1.01	9.25	113	.07	.04	.01	5.	1.01	21.55	263	.02	.02	.00	2.	
1.01	9.30	114	.07	.04	.01	5.	1.01	22.00	264	.02	.02	.00	2.	
1.01	9.35	115	.07	.04	.01	5.	1.01	22.05	265	.02	.02	.00	2.	
1.01	9.40	116	.07	.04	.01	5.	1.01	22.10	266	.02	.02	.00	2.	
1.01	9.45	117	.07	.04	.01	5.	1.01	22.15	267	.02	.02	.00	2.	
1.01	9.50	118	.07	.04	.01	6.	1.01	22.20	268	.02	.02	.00	2.	
1.01	9.55	119	.07	.04	.01	6.	1.01	22.25	269	.02	.02	.00	2.	
1.01	10.00	120	.07	.04	.01	6.	1.01	22.30	270	.02	.02	.00	2.	
1.01	10.05	121	.07	.04	.01	6.	1.01	22.35	271	.02	.02	.00	2.	
1.01	10.10	122	.07	.04	.01	6.	1.01	22.40	272	.02	.02	.00	2.	
1.01	10.15	123	.07	.04	.01	6.	1.01	22.45	273	.02	.02	.00	2.	
1.01	10.20	124	.07	.04	.01	6.	1.01	22.50	274	.02	.02	.00	2.	
1.01	10.25	125	.07	.04	.01	6.	1.01	22.55	275	.02	.02	.00	2.	
1.01	10.30	126	.07	.04	.01	6.	1.01	23.00	276	.02	.02	.00	2.	
1.01	10.35	127	.07	.04	.01	6.	1.01	23.05	277	.02	.02	.00	2.	
1.01	10.40	128	.07	.04	.01	6.	1.01	23.10	278	.02	.02	.00	2.	
1.01	10.45	129	.07	.04	.01	6.	1.01	23.15	279	.02	.02	.00	2.	
1.01	10.50	130	.07	.04	.01	6.	1.01	23.20	280	.02	.02	.00	2.	
1.01	10.55	131	.07	.04	.01	6.	1.01	23.25	281	.02	.02	.00	2.	
1.01	11.00	132	.07	.04	.01	6.	1.01	23.30	282	.02	.02	.00	2.	
1.01	11.05	133	.07	.04	.01	6.	1.01	23.35	283	.02	.02	.00	2.	
1.01	11.10	134	.07	.04	.01	6.	1.01	23.40	284	.02	.02	.00	2.	
1.01	11.15	135	.07	.04	.01	6.	1.01	23.45	285	.02	.02	.00	2.	
1.01	11.20	136	.07	.04	.01	6.	1.01	23.50	286	.02	.02	.00	2.	
1.01	11.25	137	.07	.04	.01	6.	1.01	23.55	287	.02	.02	.00	2.	
1.01	11.30	138	.07	.04	.01	6.	1.02	.00	288	.02	.02	.00	2.	
1.01	11.35	139	.07	.04	.01	6.	1.02	.05	289	0.00	0.00	0.00	0.	

1.01	11.40	140	.07	.06	.01	6.	1.02	.10	290	0.00	0.00	0.00	0.
1.01	11.45	141	.07	.06	.0.	6.	1.02	.15	291	0.00	0.00	0.00	0.
1.01	11.50	142	.07	.06	.01	6.	1.02	.20	292	0.00	0.00	0.00	0.
1.01	11.55	143	.07	.06	.01	6.	1.02	.25	293	0.00	0.00	0.00	0.
1.01	12.00	144	.07	.06	.01	6.	1.02	.30	294	0.00	0.00	0.00	0.
1.01	12.05	145	.21	.19	.02	15.	1.02	.35	295	0.00	0.00	0.00	0.
1.01	12.10	146	.21	.19	.02	17.	1.02	.40	296	0.00	0.00	0.00	0.
1.01	12.15	147	.21	.19	.01	19.	1.02	.45	297	0.00	0.00	0.00	0.
1.01	12.20	148	.21	.20	.01	18.	1.02	.50	298	0.00	0.00	0.00	0.
1.01	12.25	149	.21	.20	.01	19.	1.02	.55	299	0.00	0.00	0.00	0.
1.01	12.30	150	.21	.20	.01	18.	1.02	1.00	300	0.00	0.00	0.00	0.

SUM 32.63 30.14 2.49 2792.
(829.)(765.)(63.)(79.06)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	216.	32.	10.	9.	2792.
CMS	6.	1.	0.	0.	79.
INCHES		24.53	30.14	30.14	30.14
MM		623.13	765.45	765.45	765.45
AC-FT		16.	19.	19.	19.
THOUS CU M		19.	24.	24.	24.

HYDROGRAPH AT STALAKE * FOR PLAN 1, RTIO 1

0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	[illegible]	0.	0.	0.	[illegible]	[illegible]	0.	0.
0.	[illegible]	[illegible]	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	[illegible]	[illegible]	0.	0.	0.	0.	[illegible]	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.
0.	[illegible]	0.	0.	0.	0.	[illegible]	0.	0.	0.
0.	[illegible]	2.	3.	3.	3.	3.	3.	3.	4.
4.	[illegible]	4.	4.	4.	4.	4.	4.	4.	4.
5.	[illegible]	5.	5.	[illegible]	[illegible]	[illegible]	5.	5.	5.
5.	[illegible]	5.	5.	5.	5.	[illegible]	5.	5.	5.
5.	[illegible]	5.	5.	6.	6.	6.	6.	6.	6.
6.	[illegible]	6.	5.	6.	6.	[illegible]	6.	6.	6.
5.	[illegible]	[illegible]	5.	6.	6.	[illegible]	6.	6.	6.
6.	[illegible]	5.	5.	15.	17.	18.	18.	18.	18.
18.	1.	18.	18.	19.	19.	21.	22.	22.	22.
22.	2.	23.	23.	25.	25.	25.	23.	27.	28.
28.	2.	28.	29.	29.	29.	29.	29.	29.	29.
30.	3.	34.	48.	58.	126.	215.	129.	77.	58.
40.	3.	29.	27.	27.	27.	27.	27.	27.	27.
27.	2.	27.	27.	23.	22.	21.	21.	21.	21.
21.	21.	22.	21.	21.	21.	7.	3.	2.	2.
2.	[illegible]	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	[illegible]	2.	2.	2.	2.	2.	2.	2.	2.
2.	[illegible]	2.	2.	2.	2.	2.	2.	0.	0.
0.	[illegible]	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	216.	32.	10.	9.	2799.
CMS	6.	1.	0.	0.	79.

INCHES	24.53	30.14	30.14	30.14
MM	623.13	765.45	765.45	765.45
AC-FT	1[illegible].	19.	19.	19.
THOUS CU M	1[illegible].	24.	24.	24.

HYDROGRAPH AT STALAKE 4 FOR PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	[illegible]	0.	0.	0.	[illegible]	[illegible]	0.	0.
[illegible]	0.	[illegible]	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	0.	[illegible]	0.	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	[illegible]	1.	[illegible]	1.	[illegible]	2.	2.	2.
2.	2.	[illegible]	2.	[illegible]	[illegible]	[illegible]	[illegible]	2.	2.
2.	2.	[illegible]	2.	[illegible]	[illegible]	[illegible]	2.	2.	3.
3.	3.	[illegible]	3.	[illegible]	3.	[illegible]	3.	3.	3.
3.	[illegible]	[illegible]	3.	[illegible]	3.	5.	[illegible]	3.	3.
[illegible]	3.	[illegible]	[illegible]	[illegible]	3.	[illegible]	[illegible]	[illegible]	3.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.	[illegible]	3.
3.	3.	[illegible]	[illegible]	[illegible]	9.	[illegible]	[illegible]	[illegible]	9.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	13.	14.
19.	14.	14.	14.	[illegible]	14.	14.	14.	14.	14.
[illegible]	17.	17.	[illegible]	2[illegible].	[illegible]	10[illegible].	[illegible]	39.	29.
[illegible]	[illegible]	[illegible]	14.	14.	14.	14.	14.	14.	14.
14.	14.	14.	14.	11.	11.	11.	11.	11.	11.
11.	[illegible]	11.	11.	11.	11.	[illegible]	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	0.	0.
0.	0.	[illegible]	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	193.	14.	[illegible]	5.	1400.
CMS	3.	0.	0.	0.	40.
INCHES		12.27	15.07	15.07	15.07
MM		311.[illegible]	382.73	382.7[illegible]	382.73
AC-FT		[illegible].	10.	10.	10.
THOUS CU M		10.	12.	12.	12.

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COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS FROM LAKE 1 AND RUNOFF 4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 4	2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT LAKE 4 PLAN 1 RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	3.	3.	3.	3.
3.	3.	5.	7.	10.	13.	15.	17.	19.	21.
23.	24.	26.	27.	29.	30.	31.	33.	34.	35.
36.	37.	38.	39.	40.	41.	41.	42.	43.	44.
44.	45.	45.	46.	47.	47.	48.	48.	49.	50.
50.	51.	51.	52.	52.	53.	53.	53.	53.	54.
54.	54.	55.	55.	55.	55.	56.	56.	56.	56.
57.	57.	57.	57.	57.	57.	57.	58.	58.	58.
58.	64.	71.	79.	90.	96.	123.	142.	156.	141.
124.	181.	191.	196.	201.	208.	213.	222.	232.	239.
243.	232.	224.	227.	227.	228.	229.	237.	240.	257.
277.	280.	285.	287.	288.	289.	289.	290.	290.	293.
318.	359.	374.	359.	304.	265.	173R.	1699.	1065.	747.
547.	471.	403.	331.	335.	259.	294.	295.	296.	279.
264.	277.	277.	276.	268.	245.	21 .	224.	219.	218.
214.	217.	217.	217.	217.	217.	177.	117.	79.	55.
41.	33.	27.	24.	22.	21.	21.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	17.	13.
9.	6.	4.	3.	3.	2.	2.	2.	2.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1774.	323.	94.	94.	28216.
CMS	49.	9.	3.	3.	799.
INCHES		24.42	29.64	29.64	29.64
MM		620.19	752.75	752.75	752.75
AC-FT		161.	194.	194.	194.
THOUS CU M		197.	240.	240.	240.

SUM OF 2 HYDROGRAPHS AT LAKE 4 PLAN 1 RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	3.	4.	5.	6.	7.	9.	10.	11.
12.	12.	13.	14.	15.	15.	16.	17.	17.	18.
18.	19.	19.	20.	20.	20.	21.	21.	22.	22.
22.	23.	23.	23.	23.	24.	24.	24.	24.	25.
25.	25.	25.	25.	26.	26.	26.	26.	26.	26.
27.	27.	27.	27.	27.	27.	27.	28.	28.	28.
28.	28.	28.	28.	28.	28.	28.	29.	29.	29.
29.	29.	29.	29.	30.	42.	50.	62.	72.	79.

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PMF AND ONE-HALF PMF ROUTING

85.	86.	90.	90.	91.	91.	94.	99.	103.	106.
108.	110.	111.	112.	113.	113.	113.	114.	118.	124.
130.	135.	139.	140.	142.	143.	143.	144.	144.	144.
157.	156.	145.	178.	251.	431.	825.	811.	470.	409.
200.	200.	205.	199.	184.	178.	164.	156.	152.	147.
141.	135.	124.	148.	152.	124.	119.	114.	111.	110.
109.	109.	100.	109.	109.	109.	92.	69.	47.	33.
24.	16.	15.	13.	12.	11.	11.	10.	10.	10.
13.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	9.	7.
8.	4.	3.	3.	3.	2.	2.	1.	1.	1.

	PEAK	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	691.	169.	47.	1413.
CMS	20.	5.	1.	40.
INCHES	1.[illegible]	14.87	14.87	14.87
MM	311.39	377.61	377.61	377.61
AC-FT	[illegible]	[illegible]	[illegible]	[illegible]
THOUS CU M	38.	466.	466.	466.

HYDROGRAPH ROUTING

ROUTE CONSTANT-HYDROGRAPHS THROUGH LAKE 4

	ISTA LAKE 4	ICOMP 1	IECON 0	ITAPE 0	JPLT 0	JPRT 3	INAME 1	ISTAGE 0	IAUTO 0

ROUTING DATA

CLOSS 0.0	CLOSS 0.000	AVC 0.00	IRES 1	ISAME 1	ICOL 0	IPMP 0		LSTR 0
NSTPS 1	NSTOL 3	LAG 0	AMSKK 0.000	X 0.100	TSK 0.000	STORA -697.	ISPRAT -1	

STAGE	697.30	697.00	698.93	698.00	698.00	699.00	699.30	700.60	701.00	701.39
	701.60	701.99	702.72							
FLOW	0.0	1.39	5.00	4.70	23.00	58.01	297.00	765.00	1027.00	1569.00
	2141.00	2781.0.	4011.00							

SURFACE AREA=	0.	1.	2.	3.	2.	4.	5.	6.
CAPACITY=	0.	2.	16.	19.	23.	85.	100.	209.
ELEVATIONS=	681.	696.	697.	698.	699.	710.	720.	743.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
697.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL COQD EXPD DAMWID

579.0 0.0 0.0 0.

STATION LAKE 4. PLAN 1. RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	1.	2.	2.	2.	3.	3.	3.	3.
22.	17.	21.	24.	27.	29.	32.	32.	34.	38.
41.	45.	44.	45.	46.	46.	47.	48.	48.	49.
50.	50.	51.	51.	52.	52.	54.	53.	55.	53.
54.	54.	54.	54.	55.	55.	56.	56.	56.	56.
56.	56.	56.	57.	57.	57.	57.	57.	58.	58.
60.	68.	69.	86.	83.	77.	87.	110.	176.	155.
171.	179.	177.	189.	174.	198.	2[illegible].	216.	2[illegible].	222.
2[illegible].	23[illegible].	23[illegible].	2[illegible].	2[illegible].	22[illegible].	22[illegible].	231.	231.	241.
275.	2[illegible].	2[illegible].	2[illegible].	2[illegible].	2[illegible].	2[illegible].	269.	269.	290.
7[illegible].	27[illegible].	27[illegible].	2[illegible].	4[illegible].	6[illegible].	13[illegible].	14[illegible].	1233.	853.
6[illegible].	5[illegible].	4[illegible].	3[illegible].	3[illegible].	3[illegible].	2[illegible].	2[illegible].	292.	287.
2[illegible].	2[illegible].	2[illegible].	2[illegible].	2[illegible].	2[illegible].	2[illegible].	2[illegible].	207.	222.
2[illegible].	19.	21.	21.	21.	21.	21.	172.	190.	1[illegible].
1[illegible].	1[illegible].	2[illegible].	25.	25.	25.	2[illegible].	2[illegible].	27.	25.
25.	24.	24.	24.	24.	24.	24.	21.	21.	21.
21.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	19.	19.
17.	15.	15.	11.	9.	8.	7.	6.	5.	5.

STORAGE

15.	14.	14.	14.	15.	15.	14.	16.	16.	14.
14.	14.	15.	14.	14.	15.	14.	15.	15.	16.
14.	16.	16.	16.	14.	15.	16.	16.	16.	16.
16.	14.	16.	16.	16.	16.	16.	16.	16.	14.
16.	16.	16.	16.	16.	16.	16.	14.	14.	16.
16.	16.	15.	16.	16.	16.	16.	16.	16.	16.
16.	16.	15.	16.	16.	16.	16.	16.	16.	16.
15.	16.	16.	15.	15.	17.	17.	17.	17.	17.
17.	17.	17.	18.	18.	18.	18.	19.	19.	19.
19.	19.	19.	19.	20.	20.	20.	20.	20.	20.
21.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	20.	20.	20.	20.	21.	21.
21.	21.	21.	21.	21.	21.	21.	21.	21.	21.
21.	21.	21.	21.	21.	21.	21.	21.	21.	22.
22.	22.	22.	22.	22.	22.	22.	22.	22.	22.
22.	22.	22.	22.	22.	23.	25.	26.	25.	24.
23.	23.	22.	22.	22.	22.	22.	22.	22.	22.
22.	22.	22.	22.	22.	22.	22.	21.	21.	21.

21.	21.	21.	21.	21.	21.	21.	21.	21.	20.
20.	20.	20.	20.	20.	20.	20.	20.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.

STAGE

697.3	[illegible]	697.5	697.5	697.[illegible]	697.2	697.3	697.[illegible]	697.[illegible]	697.3
697.3	697.2	697.[illegible]	697.7	697.5	697.2	[illegible]	697.3	697.2	697.3
697.3	697.3	697.2	697.2	697.3	697.2	697.3	697.[illegible]	697.5	697.3
697.3	[illegible]	697.[illegible]	697.2	697.3	697.[illegible]	697.2	697.5	697.5	697.3
697.3	697.3	697.[illegible]	697.2	697.3	697.2	697.3	697.5	697.5	697.3
697.3	697.3	697.5	697.[illegible]	697.3	697.2	697.5	[illegible]	697.4	697.4
697.4	697.4	697.4	697.4	697.4	697.4	697.4	697.4	697.4	697.4
697.4	697.4	697.5	697.8	697.5	697.[illegible]	697.6	697.6	697.7	697.8
697.5	697.[illegible]	[illegible]	699.1	698.1	698.[illegible]	698.5	[illegible]	698.5	698.0
[illegible].7	[illegible].7	[illegible]	[illegible]	698.9	[illegible]	699.0	[illegible]	699.2	699.0
[illegible]	[illegible]	[illegible]	699.	699.0	699.	699.0	699.[illegible]	699.0	699.1
699.1	699.1	[illegible]	699.1	699.1	699.1	699.1	699.1	699.1	699.1
[illegible].1	699.1	[illegible]	699.1	[illegible].1	[illegible].1	699.1	699.1	699.1	699.1
699.1	699.1	699.[illegible]	699.1	699.1	699.1	699.1	699.1	699.1	699.1
699.1	[illegible]	699.1	699.1	699.1	699.1	699.[illegible]	699.	699.4	699.4
699.5	699.[illegible]	[illegible]	699.6	699.6	699.6	699.6	699.[illegible]	699.4	699.7
699.7	699.7	699.7	[illegible]	[illegible].7	[illegible].7	[illegible].7	699.7	699.7	699.7
[illegible]	[illegible]	[illegible]	[illegible]	699.[illegible]	699.8	699.9	699.8	699.9	699.9
[illegible]	[illegible]	[illegible]	699.7	700.1	700.5	701.2	701.4	701.1	700.7
700.4	700.2	700.1	[illegible]	699.9	699.[illegible]	699.8	699.9	699.1	699.9
699.9	[illegible]	699.4	[illegible]	699.4	699.[illegible]	699.[illegible]	699.7	699.7	699.6
699.6	[illegible]	699.6	699.6	699.6	699.6	699.6	699.5	699.3	699.2
699.1	699.1	699.0	699.0	699.0	698.9	698.7	698.9	698.9	698.9
[illegible]	698.8	698.8	698.[illegible]	698.8	698.8	698.8	698.8	698.8	698.8
698.8	698.8	698.8	698.8	698.8	698.8	698.8	698.8	698.8	698.8
698.8	698.8	698.8	698.8	698.8	698.8	698.8	698.8	698.6	698.8
698.8	698.9	698.8	698.8	698.8	698.8	698.8	698.8	698.8	698.5
698.8	698.	698.8	698.8	698.8	698.8	698.9	698.8	698.8	698.8
698.8	698.	698.8	698.8	698.8	698.1	698.8	698.8	698.8	698.7
698.7	698.7	698.7	698.7	698.6	698.6	698.5	698.6	698.5	698.6

PEAK OUTFLOW IS 1833. AT TIME 19.67 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1833.	322.	97.	97.	27821.
CMS	52.	9.	3.	3.	788.
INCHES		24.37	29.22	29.22	29.22
MM		619.28	742.20	742.21	742.21
AC-FT		160.	192.	192.	192.
THOUS CU M		197.	236.	236.	236.

STATION LAKE 4, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

STORAGE

				STAGE					
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
19.	19.	19.	19.	19.	19.	19.	19.	19.	19.
697.3	[illegible]	697.3	697.3	697.3	697.3	697.3	697.3	697.3	697.3
697.3	[illegible]	697.3	697.3	[illegible]	697.2	697.3	697.3	697.3	697.3
697.3	697.3	697.3	697.3	697.3	697.3	[illegible]	697.3	697.3	697.3
697.3	697.3	697.3	697.3	697.3	697.3	697.3	697.3	697.3	697.3
697.3	697.3	697.3	697.3	697.3	697.2	697.3	[illegible]	697.3	697.3
697.3	697.3	697.3	697.3	697.3	[illegible]	697.3	697.3	697.3	697.3
697.3	697.3	697.3	697.3	[illegible]	697.2	697.4	697.4	697.4	697.4
697.4	697.4	697.4	697.4	697.4	697.4	697.4	697.5	697.5	697.5
697.6	697.4	[illegible]	[illegible]	697.7	[illegible]	697.8	[illegible]	697.9	698.0
698.0	698.1	698.1	[illegible]	698.2	698.2	698.4	698.4	698.5	698.5
698.8	698.5	698.7	698.7	698.7	698.7	698.7	698.5	698.8	698.8
698.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	698.8	[illegible]	698.9	698.9
698.8	[illegible]	[illegible]	[illegible]	698.9	[illegible]	698.9	698.9	[illegible]	698.9
698.9	[illegible]	[illegible]	[illegible]	698.9	[illegible]	698.9	[illegible]	698.9	698.9
[illegible]	698.9	[illegible]	[illegible]	699.0	[illegible]	699.0	[illegible]	699.1	699.1
699.1	699.2	[illegible]	699.2	[illegible]	[illegible]	699.2	[illegible]	699.2	699.2
699.2	[illegible]	[illegible]	699.3	699.3	[illegible]	699.3	[illegible]	699.3	699.3
699.3	[illegible]	[illegible]	699.4	699.4	[illegible]	699.4	[illegible]	699.4	699.4
699.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	700.7	[illegible]	700.0
700.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	699.5	699.4	699.4
699.4	[illegible]	699.4	[illegible]	[illegible]	[illegible]	699.3	699.3	699.3	699.3
699.3	[illegible]	698.5	[illegible]	699.3	[illegible]	[illegible]	699.2	699.1	699.1
[illegible]	[illegible]	[illegible]	[illegible]	698.8	[illegible]	[illegible]	698.7	698.7	698.7
698.7	698.7	698.7	[illegible]	698.7	698.7	[illegible]	[illegible]	698.7	698.6
[illegible]	[illegible]	698.6	[illegible]	[illegible]	[illegible]	698.5	698.6	698.6	698.6
[illegible]	[illegible]	698.6	[illegible]	699.6	[illegible]	698.6	698.6	698.6	698.6
698.6	698.6	698.6	[illegible]	698.5	[illegible]	698.6	698.5	698.6	698.6
698.6	698.6	698.5	[illegible]	698.6	[illegible]	698.6	698.6	698.6	698.6
[illegible]	698.5	[illegible]	[illegible]	698.5	[illegible]	698.6	698.6	698.6	698.6
698.6	698.5	698.6	698.5	[illegible]	698.6	698.6	[illegible]	698.6	698.5

PEAK OUTFLOW IS 610. AT TIME 19.67 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	610.	162.	46.	46.	13762.
CMS	23.	5.	1.	1.	390.
INCHES		12.22	14.46	14.46	14.46
MM		310.30	367.17	367.18	367.16
AC-FT		80.	95.	95.	95.
THOUS CU M		99.	117.	117.	117.

********** ********** ********** ********** **********

PMF AND ONE-HALF PMF ROUTING

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1 1.00	RATIO 2 .70
HYDROGRAPH AT	LAKE	.02	1	994.	147.
		(.05)		(28.17)	(4.16)
ROUTED TO	LAKE	.02	1	371.	145.
		(.06)		(10.50)	(4.12)
HYDROGRAPH AT	LAKE 1	.09	1	1784.	674.
		(.23)		(50.53)	(19.09)
2 COMBINED	LAKE 1	.11	1	1667.	799.
		(.29)		(47.21)	(22.63)
ROUTED TO	LAKE 1	.11	1	1369.	747.
		(.29)		(38.78)	(21.16)
HYDROGRAPH AT	LAKE	.01	1	215.	124.
		(.03)		(6.09)	(3.51)
2 COMBINED	LAKE	.12	1	1730.	871.
		(.32)		(49.00)	(24.67)
ROUTED TO	LAKE	.12	1	1415.	841.
		(.32)		(40.07)	(23.81)

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SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	735.00	735.00	737.00
STORAGE	1.	1.	2.
OUTFLOW	0.	0.	108.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	737.49	.49	2.	377.	.33	15.60	15.50
.50	737.24	.24	2.	178.	.19	15.60	15.58

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	700.25	700.25	703.00
STORAGE	2.	2.	5.
OUTFLOW	0.	0.	130.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	704.74	1.74	7.	1569.	1.35	15.67	12.42
.50	704.12	1.12	4.	772.	.75	15.63	15.33

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	697.30	697.30	699.00
STORAGE	16.	16.	27.
OUTFLOW	0.	0.	34.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	701.44	2.44	2[illegible].	1833.	10.33	15.67	0.00
.50	700.65	1.65	24.	610.	6.17	15.67	0.00

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PERCENT OF PMF FLOOD ROUTING
EQUAL TO SPILLWAY CAPACITY

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********
     1                A1                          DAM SAFETY INSPECTION - MISSOURI
     2                A2                    AC SCHNEIDER LAKE DAM ( MO 21563)
     3                A3                              PERCENT PMF
     4                *      300         0         5         0         0         0         0         0        -4         0
     5                  1      5
     6                J      1         4         1
     7                J1   .05      .06       .07       .09
     8                *      0  LAKE 2                                                    1
     9                K1       RUNOFF CALCULATION FOR DRAINAGE AREA 2
    10                *      1         2      .022                 .022         1
    11                B                25.1       100       120       130
    12                T                                                                -1       -78
    13                A2               .136
    14                K      0         0         1
    15                *      1  LAKE 2                                                  1
    16                K1       ROUTE HYDROGRAPH THROUGH DAM 2
    17                Y                                    1         1
    18                Y1     1                                                      -735        -1
    19                Y4   735     736.5     736.9     737.2     737.4     737.6     738.6     739.4
    20                Y5     0        50        90       143       284       606      1334      2291
    21                SA     0        .3        .6         2
    22                SE   727       735       737       740
    23                S5   735
    24                SD   737
    25                D0    10        .5     731.8         1       735       737
```

```
K       0  LAKE 1                                                                  1
K1       RUNOFF CALCULATION FOR DRAINAGE AREA 1
M       1        2     .089                .089        1
P                25.1      100      120      130
T                                                                      -1      -78
R2               .077
R       0        0         1
K       2  LAKE 1                                                                 1
K1       COMBINE HYDROGRAPHS FROM LAKE 2 AND 1
R       1  LAKE 1                                                                 1
R1       ROUTE COMBINED HYDROGRAPH THROUGH DAY 1
Y                                        1         1
Y1      1                                                          -700.25      -1
Y4700.25    701.7    703.1    703.6    704.5    705.2      706
Y5      0       43      137      451      957     1646     2465
Y6      0        1        1      2.5        5      9.5       14       18       22
YE    693      701      703      710      720      730      740      750      760
Y1700.25
SO    703
SR     10       .5      700        1   700.25      703
K       0  LAKE 4                                                                  1
K1       RUNOFF CALCULATION FOR DRAINAGE AREA 4
M       1        2     .012                .012        1
P                25.1      100      120      130
T                                                                      -1      -82
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51                  AC          .0144
52                  X       0       0       1                                       1
53                  K       2  LAKE 4
54                  K1        COMBINE HYDROGRAPHS FROM LAKE 1 AND RUNOFF 4          1
55                  K       1  LAKE 4
56                  K1        ROUTE COMBINED HYDROGRAPHS THROUGH DAM 4
57                  V                                   1       1
58                  Y1      1                                                   -697.3      -1
59                  Y4  697.3       693     698.5'  698.58      698.8       699     699.9   700.6   700.9   701.3
60                  Y4  701.6     701.9     702.7
61                  Y5              1.3       3.4         4.7         23          34      287     765     1027    1554
62                  Y5    2141      2751      4611
63                  YA                 1         2         2.3         2.4          4       5       6
64                  YE     681       688     697.3       698.5         699         710     720     740
65                  YS  697.3
66                  YD     699
67                  *       00
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	LAKE 2
ROUTE HYDROGRAPH TO	LAKE 2
RUNOFF HYDROGRAPH AT	LAKE 1
COMBINE 2 HYDROGRAPHS AT	LAKE 1
ROUTE HYDROGRAPH TO	LAKE 1
RUNOFF HYDROGRAPH AT	LAKE 4
COMBINE 2 HYDROGRAPHS AT	LAKE 4
ROUTE HYDROGRAPH TO	LAKE 4
END OF NETWORK	

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  14 FEB 79
**********

RUN  DATE= 80/10/14.
     TIME= 08.18.17.

                                DAM SAFETY INSPECTION - MISSISSIPPI
                              AC SCHEDULE: LAKE DAN ( MO 31662)
                                        PERCENT PMP

                                      JOB SPECIFICATION
                                                                    IPLT    IPRT    NSTAN
                                                                       0       0        0
                                                                    JPLT    JPRT
                                                                       0       0

                                  MULTI-PLAN ANALYSES TO BE PERFORMED
                                  NPLAN = 1  NRATIO = 1  LRATIO = 1

                                  RATIOS=  .00    .00    .00    .00

                                        RUNOFF ON DEF COMPLETION

                                  HYDROGRAPH CALCULATION FOR PAVEMENT AREA 1

                                    ISTAT   ICOMP   IECON   ITAPE   JPLT    JPRT    INAME   ISTAGE   IAUTO
                                     LAKE       0       0       2       0       1        0        0

                                                HYDROGRAPH DATA
                                    IHYDG   IUHG   TAREA    SNAP    TRSDA    TRSPC    RTIOL   ISNOW   ISAME   LOCAL
                                        1      0     .03     3.00      .00     1.00    0.000       0       0       0

                                                PRECIP DATA
                                          SCS      PMS        R6       R12      R24      R48      R72      R96
                                         3.00    29.10   100.00   120.00   130.00     0.00     0.00     0.00

                                                LOSS DATA
                                    LKRCH   STRKR   DLTKR   RTIOL   STRKS   STRKS   RTIOS   STRTL   CNSTL   ALSMS   RTIMP
                                                 0.00    0.00    1.00    0.00    0.00    1.00   -1.00  -78.00    0.00    0.00

                                  CURVE NO =  -71.00  METNESS =  -1.00  EFFECT IN P   78.00

                                                UNIT HYDROGRAPH DATA
                                              TC=  0.03     LAG=  .02

                                                RECESSION DATA
                                          STRTQ=     .00    QRCSN=    0.00    RTIOR= 1.00

                                              END-OF-PERIOD FLOW
                                    HR.DA   HR.MN   PERIOD   RAIN   EXCS   LOSS   COMP Q        HR.DA   HR.MN   PERIOD   RAIN   EXCS   LOSS   COMP Q
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SUM 32.63 29.47 5.16. 5245.
(829.)(749.)(80.)(142.86)

HYDROGRAPH ROUTING

ROUTE HYDROGRAPH THROUGH DAM 2

ISTAT	ICOMP	IECON	ITAPE	JPLT	JPRT	ISAME	ISTAGE	IAUTO
LAKE 2	1	0	9	0	3	1	0	0

ROUTING DATA

CLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.00	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	ISK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0745.	0

STAGE	0.	0.	0.	0.	0.	0.	0.
FLOW	0.	0.	0.	0.	0.	0.	0.
SURFACE AREA	0.	0.	0.	0.			
CAPACITY	0.	0.	0.	0.			
ELEVATIONS	0.	0.	0.	0.			

CHIL	SPLIT	COOL	CAPW	ELEVL	COOL	CAREA	EXCL
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPO	SAREA
0.0	0.0	0.0	0.

DAM BREACH DATA

AVWID	Z	FLOW	TFAIL	WSEL	FAILEL
0.	0.0	0.00	1.00	0.00	0.00

PEAK OUTFLOW IS 14. AT TIME 15.67 HOURS

PEAK OUTFLOW IS 17. AT TIME 15.67 HOURS

PEAK OUTFLOW IS 20. AT TIME 15.67 HOURS

PEAK OUTFLOW IS 22. AT TIME 15.67 HOURS

SUB-AREA RUNOFF COMPUTATION

RUNOFF CALCULATION FOR DRAINAGE AREA 1

	ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 1		0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.09	7.00	.09	1.00	0.000	0	0	0

PRECIP DATA

SHEF	PMS	R6	R12	R24	R48	R72	R96
0.00	33.10	110.00	120.00	130.00	0.00	0.00	0.00

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
	.00	0.00	1.00	.00	0.00	1.00	-1.00	-75.00	0.00	0.00

COMP NO = -7+.00 WETSH = -1.00 EFFECT IN = 75.00

UNIT HYDROGRAPH DATA

TC= .00 LAG= .17

RECESSION DATA

STRTQ= 0.10 QRCSN= 0.00 RTIOR= 1.00

SOLUTION-BEGINNING FLOW

0

HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

SUM 3.03 23.47 3.15 70240.
(239.00 74.00 80.00 574.27)

COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS FROM LAKE 1 AND 1

	ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 1		2	0	0	0	0	1	0	2

HYDROGRAPH ROUTING

ROUTE COMBINED HYDROGRAPH THROUGH DAM 1

	ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE 1		1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	ISK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-700.	-1

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STAGE	700.00	701.70	705.10	703.80	704.50	705.20	706.00	
FLOW	0.00	83.00	137.00	451.00	797.00	1646.00	2465.00	
SURFACE AREA=	3.	1.	1.	3.	5.	10.	14.	18.	22.
CAPACITY=	0.	1.	5.	17.	33.	127.	241.	401.	601.
ELEVATION=	699.	701.	705.	711.	720.	730.	740.	750.	760.

CPEL	SPILW	CDSW	EXSW	FLEVL	COOL	CAREA	EXPL
70.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	CAREA
703.0	3.0	1.0	.0

DAM BREACH DATA

BRLEN	Z	ELBM	TFAIL	MSEL	FAILEL
10.	1.0	700.00	1.00	700.25	703.00

PEAK OUTFLOW IS 6[illegible] AT TIME 1[illegible]

PEAK OUTFLOW IS 58. AT TIME 1[illegible] HOURS

PEAK OUTFLOW IS [illegible] AT TIME 1[illegible]

PEAK OUTFLOW IS [illegible] AT TIME 1[illegible]

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*SUBAREA RUNOFF COMPUTATION

RUNOFF CALCULATION FOR DRAINAGE AREA 4

ITYP	ICOMP	IECON	ITAPE	JPRT	JWRT	INAME	ISTAGE	IAUTO
LAPE =	0	0	3	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	.01	0.00	.01	1.00	0.000	0		

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	25.10	100.00	120.00	130.00	0.00	0.00	0.00

LOSS DATA

LNOPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	-1.00	-82.00	0.00	0.00

CURVE NO = -82.00 WETNESS = -1.00 EFFECT CN = 42.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= .01

RECESSION DATA

STRTQ= 0.15 QRCSN= 3.00 RTIOR= 1.00

FLOW-PER-PERIOD FLOW

HYDRO	PERIOD	RAIN	EXCS	LOSS	COMP Q	AREA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
							SUM	37.63	33.14	2.49	2742.	
								(.029)	(.735)	(.65)	(74.06)	

COMPUTE HYDROGRAPHS

COMPUTE HYDROGRAPHS FOR LEAF 1 AND 1 CASES

	ISTAT	ICOMP	ICONN	ISTAQ	IPLT	JPRT	INAME	ISTAGE	IAUTO
LEAF	0	2	0	3		0	1	0	0

ROUTE HYDROGRAPHS

ROUTE THRU 1 WITH TABLE INFLOW AT 0

	ISTAT	ICOMP	ICONN	ISTAQ	IPLT	JPRT	INAME	ISTAGE	IAUTO
LEAF	0	1	0	0	0	0	1	0	0

ROUTING DATA

RSVRIC	CLOSS	CAVG	IRES	ISAME	ICAT	IOPR		LSTR
0.0	1.000	0.00	1	1	0	0		0
NSTPS	ITOL	LAG	AMSKK		TSK	STOR	ISPRAT	
1	0	0	0.000	0.000	1.000	4497.	-1	

STAGE	697.5	698.00	698.50	699.00	699.50	700.00	700.50	701.00	701.50	702.00
	703.00	703.50	704.00							
FLOW	0.0	1.30	3.40	6.70	13.00	34.01	297.00	765.00	1027.00	1554.00
	2161.00	2751.00	4611.00							
SURFACE AREA=	0.	1.	2.	3.	3.	4.	5.	6.		
CAPACITY=	0.	2.	16.	14.	20.	55.	100.	230.		
ELEVATION=	691.	698.	697.	699.	700.	710.	720.	740.		

CREL	SPWID	COOL	EXPW	CLEVL	COOL	CAREA	EXPL
697.5	0.0	0.0	0.0	0.0	1.0	0.0	0.0

DAM DATA

TOPEL	COOL	EXPD	DAMWID
699.0	0.0	0.0	0.

PEAK OUTFLOW IS 32. AT TIME 14.00 HOUR

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1 .05	RATIO 2 .06	RATIO 3 .07	RATIO 4 .09
HYDROGRAPH AT	LAKE 2	.02 (.06)	1	20. (.56)	24. (.67)	28. (.78)	32. (.89)
ROUTED TO	LAKE	.02 (.06)	1	14. (.40)	17. (.48)	20. (.55)	22. (.63)
HYDROGRAPH AT	LAKE 1	.09 (.23)	1	65. (1.85)	79. (2.22)	92. (2.59)	105. (2.96)
2 COMBINED	LAKE 1	.11 (.29)	1	77. (2.18)	94. (2.65)	108. (3.06)	123. (3.48)
ROUTED TO	LAKE 1	.11 (.29)	1	40. (1.14)	51. (1.45)	66. (1.86)	80. (2.26)
HYDROGRAPH AT	LAKE 4	.01 (.03)	1	11. (.31)	13. (.37)	15. (.42)	17. (.48)
2 COMBINED	LAKE 4	.12 (.32)	1	44. (1.24)	57. (1.62)	72. (2.03)	86. (2.43)
ROUTED TO	LAKE 4	.12 (.32)	1	32. (.90)	45. (1.27)	60. (1.71)	74. (2.11)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	735.00	735.00	737.00
STORAGE	1.	1.	2.
OUTFLOW	0.	0.	108.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.05	735.35	0.00	1.	14.	0.00	15.67	0.00
.06	735.42	0.00	1.	17.	0.00	15.67	0.00
.07	735.49	0.00	1.	20.	0.00	15.67	0.00
.08	735.57	0.00	1.	22.	0.00	15.67	0.00

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SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	700.25	700.25	705.00
STORAGE	2.	3.	5.
OUTFLOW	0.	0.	130.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.00	701.60	0.30	3.	40.	0.00	15.83	0.00
.36	701.84	0.00	4.	53.	0.00	15.75	0.00
.37	702.05	0.12	4.	66.	0.00	15.75	0.00
.38	702.10	0.16	4.	80.	0.00	15.75	0.00

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	897.30	897.30	899.00
STORAGE	16.	16.	20.
OUTFLOW	0.	0.	74.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.04	898.56	0.03	20.	32.	0.00	16.08	0.00
.06	898.84	.04	20.	45.	.03	16.00	0.00
.07	898.94	.04	20.	50.	.07	15.92	0.00
.10	899.14	.14	20.	74.	.83	15.83	0.00

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